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ABSTRACT

The study investigated the effect of guided paraprofessional assistance on the academic achievement of lower achieving intermediate grade migrant children. It examined one possible means of overcoming some of the overwhelming handicaps experienced by migrant children by using indigenous paraprofessionals as a humanizing, tutorial factor. Eighty migrant students, in both the 5th and 6th grades, were chosen for this study when they were residing in the San Joaquin Valley (California) during the 1971-72 school year. The 35 paraprofessionals used were mostly Spanish speaking. The amount of assistance received by each migrant child was recorded by resource teachers in the 34 school sites surveyed. The research indicated that: (1) lower achieving intermediate students who received paraprofessional assistance showed greater achievement than children who received no such help; (2) paraprofessional assistance in reading was somehow especially beneficial to 6th grade boys; (3) there were no differences between 5th and 6th grade levels in achievement gains; and (4) although it was expected that the lowest achieving student might benefit the most from paraprofessional assistance, this was not the case. Subjective conclusions about minimal achievement gains were listed, along with suggestions for improving paraprofessional assistance and recommendations for further research. (KM)

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THE EFFECT OF PARAPROFESSIONAL ASSISTANCE
ON THE ACADEMIC ACHIEVEMENT OF
MIGRANT CHILDREN

A Dissertation
Presented to
the Graduate Faculty of the
University of the Pacific

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

---

by
Lelia Veaco
December 3, 1973

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TABLE OF CONTENTS

Chapter Page

1 THE PROBLEM AND OBJECTIVES OF THE STUDY. 1
  INTRODUCTION TO THE PROBLEM. 1
    The Educational Plight of Migrant Children 2
    The Rationale for Paraprofessional Assistance . . . 4
  STATEMENT OF THE PROBLEM 9
  SIGNIFICANCE OF THE STUDY 9
  OVERVIEW OF THE PROCEDURES 9
  RESEARCH HYPOTHESES 10
    Assumptions 11
    Limitations 11
  DEFINITIONS OF TERMS 12
  SUMMARY 14

2 REVIEW OF THE LITERATURE 16
  MIGRANT CHILDREN 16
    Migrancy, Poverty and Health 17
    Cultural and Language Differences Which Stem from a Mexican Heritage. 24
    Summary 28
  MIGRANT EDUCATION PROGRAMS 29
    The 1966 Migrant Amendment Gave Impetus to Migrant Education 29
    The Present Study and the California Plan for the Education of Migrant Children 31
    Variations in Migrant Education Programs 36

Chapter Page

Migrant Education in Surveys 40
Summary 41
DIFFERENCES IN ACHIEVEMENT RELATED TO THE SEX OF THE STUDENT 42
Summary 45
TUTORING BY OTHER NON-PROFESSIONALS WITH LOW ACHIEVING STUDENTS 45
Student Tutoring 46
Tutoring by College Students and Other Adults . . . 52
Summary 57
THE PARAPROFESSIONAL AND PUPIL PERFORMANCE 58
The Use of Paraprofessionals in the Classroom . . . 58
Descriptive Reports Suggestive of General Trends in Paraprofessional Effectiveness 61
Negative Results and Paraprofessional Assistance . . 64
The Paraprofessional and Pupil Performance 67
Summary 73
SUMMARY 75
3 THE DESIGN AND PROCEDURES OF THE STUDY 77
THE SETTING 77
THE SUBJECTS 78
The Paraprofessionals 78
The Migrant Children 81
THE TREATMENT GROUPS 84
THE INSTRUMENTS 85
The Checklist of Assistance Received 86
The Comprehensive Tests of Basic Skills (CTBS) . . . 86
THE PROCEDURES 89

Chapter Page

THE RESEARCH DESIGN 91

THE HYPOTHESES 94

THE STATISTICAL ANALYSES 95

SUMMARY 96

4 RESULTS OF THE STUDY 98

INTRODUCTION 98

ACHIEVEMENT GAINS, THE TREATMENT GROUPS, AND THE SEX OF THE SUBJECTS 102

ACHIEVEMENT GAINS AND THE GRADE LEVELS 107

ACHIEVEMENT GAINS AND INITIAL ACHIEVEMENT LEVEL . . . 108

SUMMARY OF THE INTERPREATIONS OF THE DATA 112

SUMMARY 114

5 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS 116

SUMMARY 116

Introduction and Survey of Literature Related to the Study 116

Procedures Followed 119

Data Collected 119

Treatment of the Data 120

CONCLUSIONS AND IMPLICATIONS OF THE STUDY 121

Subjective Conclusions 124

RECOMMENDATIONS FOR FURTHER RESEARCH 127

REFERENCES CITED 128

APPENDIX 144

LIST OF TABLES

Table | Page

1. Summary of Pretest Descriptive Data Raw Scores and Grade Equivalent (GE) Scores from Comprehensive Tests of Basic Skills 82
2. Summary of Descriptive Data Group Sizes 83
3. Summary of Descriptive Data Raw Score Means, Gain Score Means and Standard Deviations from Pretests and Posttests on the Comprehensive Tests of Basic Skills Arithmetic Achievement 100
4. Summary of Descriptive Data Raw Score Means, Gain Score Means, and Standard Deviations from Pretests and Posttests on the Comprehensive Tests of Basic Skills Reading Achievement 101
5. Summary of Descriptive Data Mean Gain Scores from the Comprehensive Tests of Basic Skills Arithmetic Subtest Fifth Grade: Sex by Treatment Group 103
6. Summary of the Two-way Analysis of Variance Arithmetic Achievement Gain Scores from the Comprehensive Tests of Basic Skills Fifth Grade: Sex by Treatment Group 103
7. Summary of Descriptive Data Mean Gain Scores from the Comprehensive Tests of Basic Skills Reading Subtest Fifth Grade: Sex by Treatment Group 104
8. Summary of the wo-way Analysis of Variance Reading Achievement Gain Scores from the Comprehensive Tests of Basic Skills Fifth Grade: Sex by Treatment Group 104
9. Summary of Descriptive Data Mean Gain Scores from the Comprehensive Tests of Basic Skills Arithmetic Subtest Sixth Grade: Sex by Treatment 105
10. Summary of the Two-way Analysis of Variance Arithmetic Achievement Gain Scores from the Comprehensive Tests of Basic Skills Sixth Grade: Sex by Treatment 105
11. Summary of Descriptive Data Mean Gain Scores from the Comprehensive Tests of Basic Skills Reading Subtest Sixth Grade: Sex by Treatment 106

Table Page

12. Summary of the Two-way Analysis of Variance Reading Achievement Gain Scores from the Comprehensive Tests of Basic Skills Sixth Grade: Sex by Treatment 106

13. Summary of Descriptive Data Mean Gain Scores from The Comprehensive Tests of Basic Skills Arithmetic Achievement Grade Level by Sex 109

14. Summary of the Two-way Analysis of Variance Arithmetic Achievement Gain Scores from the Comprehensive Tests of Basic Skills Grade Level by Sex 109

15. Summary of Descriptive Data Mean Gain Scores from The Comprehensive Tests of Basic Skills Reading Achievement Grade Level by Sex 110

16. Summary of 2 by 2 Analysis of Variance Reading Achievement Gain Scores from the Comprehensive Tests of Basic Skills Grade Level by Sex 110

17. Results of Fifth Grade Correlation Analyses Initial Achievement Levels and Achievement Rate Pretest Quartile and Gain Scores from Comprehensive Tests of Basic Skills 111

18. Results of Sixth Grade Correlation Analyses Initial Achievement Level and Achievement Rate Pretest Quartile and Gain Scores from Comprehensive Tests of Basic Skills 111

19. Summary of Analysis of Variance Results 112

20. Descriptive Data Entered on Tabulation Cards 147

Chapter 1

THE PROBLEM AND OBJECTIVES OF THE STUDY

INTRODUCTION TO THE PROBLEM

The promise of education today is that each citizen will receive those educational advantages which prepare him for full participation in our democratic society. The children of California's migratory farm workers have not benefited from our educational system to the extent that they can expect to move outside the migrant stream. Their drop out rate is high, usually by the eighth grade. Migrant children go out into the world poorly prepared for economic success.

Adequate academic progress is difficult for migrant children throughout their school years. From the beginning they experience difficulty in meeting the demands of the school world. Contributing to their lag in academic achievement are the following debilitating circumstances: irregular attendance and lack of continuity in schooling, economic and social deprivation, and greater than average health problems. In addition linguistic and cultural differences stem from the Mexican-American heritage of the majority of California's migratory farm workers.

Language problems were blamed for retarded academic achievement by Spanish surname children according to Stocker (1967). A number of writers (Swartz, 1969; Carter, 1970; Justin, 1970; and Rivera, 1970) have associated the Mexican-American lower achievement with cultural differences from those of the dominant American culture.

Bernal (1969) found that the average Mexican-American drops out of school by the seventh grade, and in California 73.5 percent drop out of high school before graduation. Coleman's (1966) study revealed 85 percent of Mexican-Americans in his sample ranked below the dominant Anglo-American group in school achievement. Current literature on the Mexican-American indicates a growing awareness of the necessity of improving the educational opportunities of these students.

In an analysis of the education of children of migrant argicultural workers in Arkansas, Barnes (1971) found in data received from the "Uniform Migrant Student Transfer Form" that seven percent were non-readers, 56 percent were below average, 35 percent average and three percent skilled. On a standardized achievement test migrant children averaged 1.3 grades below grade level.

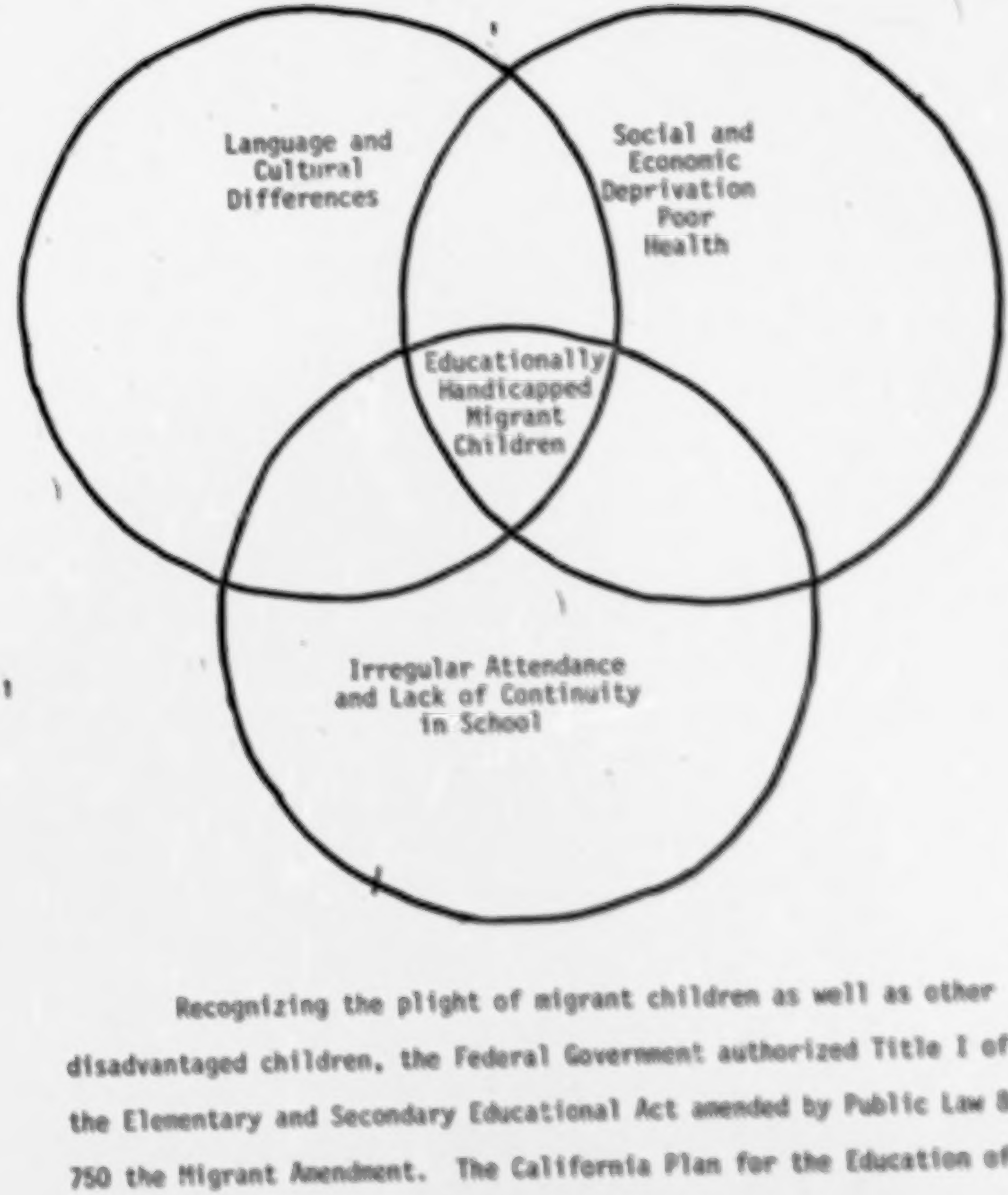
The question of how to meet these special educational problems of migrant children has long been of concern to educators in California's agricultural communities where there is a large population of Mexican-American farm workers.

The Educational Plight of Migrant Children

Migrant children's educational plight has been described by the California State Department of Education (1971:1).

> Coming from the least affluent segment of American society these children move frequently, attend school irregularly, and suffer health defects and language handicaps which result in significantly retarded progress in school. In general their rate of progress has not been more than .7 month for every month spent in school. This retardation is cumulative and eventuates in most becoming early school leavers, poorly prepared for economic success or upward social mobility.

These problems are of such magnitude and severity that local school districts have been unable to solve them with the resources normally available.


Language and Cultural Differences
Social and Economic Deprivation Poor Health
Educationally Handicapped Migrant Children
Irregular Attendance and Lack of Continuity in School

Recognizing the plight of migrant children as well as other disadvantaged children, the Federal Government authorized Title I of the Elementary and Secondary Educational Act amended by Public Law 89-750 the Migrant Amendment. The California Plan for the Education of

Migrant Children was established to improve and implement educational programs for migratory children in this state. Under the California Plan the Region IV Migrant Education Proposal provided a program of supplementary educational assistance to migrant children within the boundaries of Fresno County. A major emphasis of the educational component of Region IV was the use of paraprofessionals who were employed to function as tutors of migrant students.

The Rationale for Paraprofessional Assistance

One means of solving the educational plight of migrant children has been proposed. Use paraprofessionals hired by the local school districts, indigenous to local community to come into the classroom and give assistance to migrant children. How much effect can assistance from these paraprofessionals have?

Riessman has long been an advocate of using the indigenous paraprofessional to improve the learning of disadvantaged children. In 1972 he wrote:

> If the paraprofessional is a member of a minority group and lives in the community, he may help to bring a new ethos into the school. He may serve as a model, bring in aspects of his own culture, and assist generally in improving the self concept of the youngsters. (Riessman, 1972:88).

In 1964 before the paraprofessional movement had begun Riessman (1964) pointed out that use of the indigenous low income non-professional would help in changing the character of the school system from a top heavy middle class kind of situation to a more representative one.

In writing on the special educational needs of Mexican-Americans, Knowlton (1971) described the use of paraprofessionals drawn from the ranks of migrant labor as an innovation of considerable promise. Knowlton stated:

> It is highly essential that migrant children be given an education adequate enough to enable them to find employment outside the migrant stream (Knowlton, 1971:176).

Deutch, Kotz and Jensen (1968) described the gross inequalities in the life opportunities of youth from different social classes and racial groups. These authors wrote of a valuable innovation in school personnel, the greatly expanded use of non-professionals sometimes referred to as subprofessionals. These are persons who are indigenous to the disadvantaged community.

Hickman (1972) advocated the use of volunteer help in schools.

> The mixture of racial and ethnic groups, the emphasis on individualized instruction, and the cry of failure in the schools have forced a new look at the legitimacy of involving lay people in instruction with the professional teacher. (Hickman, 1972:121).

Saltzman (1965) urged that paraprofessionals be chosen from the ranks of the poor themselves and be trained to work with disadvantaged children. Saltzman suggested that meaningful teaching roles could be an important initial step toward producing fundamental changes in the character of the school.

Taba (1966:215) explained the difficulties experienced by the disadvantaged student in terms of social distance:

> Social distance between the school culture and home culture results in the inability to use the means of learning that the school provides, generates hostility to school and resistance to what it teaches.

Lack of success in school for certain groups of children suggested a two way cause to Taba, the factors residing in the background of the children and the factors residing in the school program. Wilkerson (1970:4) carried this theme a step further:

> The critical issue is whether the characteristics which have been ascribed to disadvantaged children are necessarily associated with and caused by impoverished home environments or are rather the consequences of the kinds of experiences provided by the schools which such children attend.

Can the paraprofessional improve the kinds of experiences provided by the school?

The paraprofessional and communication. Klopf and Bowman (1966) advocated the use of non-professional teaching assistants who may be able to modify the traditional teacher-student relationship. "The child," they hypothesized, "may be more receptive to being taught by someone from his own background with whom he can communicate freely and identify."

In 1969 these authors urged for closer linkage of school and community through the use of the paraprofessional for the purpose of overcoming the communication blocks that often exist between the middle class professional and disadvantaged children (Bowman and Klopf, 1969).

Gans suggested that paraprofessionals can bridge the gap between school and community as he put forth the notion:

> People drawn from lower socio economic strata may have special skills for communication across class lines. (Gans, 1965:187).

Armas (1972) proposed that cultural differences are the number one consideration for the school when it deals with children from different cultures. Armas stated:

> It is too often taken for granted that the communication process with culturally different children takes place as readily as it might with children from Anglo cultures.

Armas contrasted the nonverbal and informal communication skills of the children with the formal communication skills in which the professional teachers are trained. Armas believed that these differences create problems of communication breakdown.

This investigator suggests that there are fewer breakdowns in communication between the paraprofessional and disadvantaged children. The paraprofessional when she is dealing with the individual migrant child has a greater opportunity to listen to the child and speak to him on a personal basis.

The paraprofessional and a humanizing influence. Rogers (1969) has stressed the importance of certain kinds of persons to facilitate learning. This person is most effective when he accepts the learner exactly where he is, who spontaneously uses different approaches that seem natural to the situation, who is an empathetic listener. The facilitator of learning, according to Rogers, is a real person, entering into a relationship with the learner. Rogers stressed: "These qualities have nothing to do with training."

In a paper on paraprofessional utilization Matheny and Oslin (1970) speculated that growing utilization of paraprofessionals may be the result of a rising humanitarian tide as well as better diagnostic procedures which have demonstrated the need for more assistance in education. These authors stress the language and color advantages of the paraprofessional as well as a keener appreciation for the plight of the underprivileged than that of the middle class teacher.

Allen and Morrison (1972) urged the use of the paraprofessional within the differentiated staffing system:

> Differentiated staffing is a specific response to the current need for individualized instruction in our monolithic depersonalized educational establishment.

In reference to the wise use of paraprofessionals Michael (1973) stated:

> The most important consideration of all: that we need individuals who can and will help to humanize our schools by helping both teachers and students.

Empirical evidence of the effect of paraprofessional assistance is needed. The use of paraprofessionals to give aid to disadvantaged children is a growing phenomenon. Findley and Henson (1971) found 188,000 teacher aides employed in the nation's schools. They estimated that by 1977 the figure will have risen to over 1-1/2 million. Yet, few programs have been examined objectively. Riessman and Gartner (1969) reported that:

> The bulk of the current literature on the use of paraprofessionals in the schools focuses upon their activities in the classroom, their selection, training and compensation, and interaction between teacher and aide. Less documented is the relationship of the aide to pupils' performance. (Riessman and Gartner, 1969:21).

Although the picture has substantially changed since 1965 Wilkerson's observation still holds true:

> The general premise that the educational handicaps commonly observed among socially disadvantaged children can be overcome in a large measure through appropriate school experiences is well anchored in psychological and sociological theory but how best to bring about these experiences is still an open question. (Wilkerson 1965:438).

In his review of studies dealing with the use of teacher aides at the secondary level Nickerson (1972) urged that further research be carried out on the effect of teacher aides.

While there is a substantial body of literature relative to the use of paraprofessionals the outcomes of few programs have been subjected to statistical tests of significance. Subjective evaluations are in the majority.

The effect of paraprofessional assistance on the academic achievement of migrant children has not been shown.

STATEMENT OF THE PROBLEM

The purpose of the study was to determine the effect of paraprofessional assistance on the academic achievement of lower achieving intermediate grade migrant children.

SIGNIFICANCE OF THE STUDY

The study is one of importance for the following reasons:

1. It adds to the body of knowledge needed for solving migrant children's educational retardation.
2. It adds to our understanding of the use of paraprofessionals as teaching assistants.
3. It contributes toward finding humanistic solutions to educational problems.
4. It may help in decision making concerned with the expenditure of funds to help educationally disadvantaged children.
5. It could lead to more low income persons with minimal schooling finding rewarding careers in giving service to the disadvantaged children in our schools.

OVERVIEW OF THE PROCEDURES

To realize the purposes of the study the researcher followed these procedures: (1) gathered data relative to the pretest and posttest achievement of fifth and sixth grade identified migrant students; (2) collected data relative to the amount and kind of paraprofessional assistance received by each identified migrant student at each school site; (3) selected those students designated as lower achieving as a means of controlling the variables under investigation; (4) presented preservice and inservice training along with other resource teachers and curriculum coordinators to paraprofessionals; provided appropriate learning activities, materials and games in arithmetic and reading especially developed or purchased for use with migrant children; guided and encouraged paraprofessionals throughout the year; (5) determined which students had been present for both pretesting and posttesting as well as throughout the school year; (6) sorted the pretest and posttest achievement raw scores according to subject, grade level, sex, treatment group, initial achievement level; (7) punched the data on tabulation cards; (8) subjected the data to analyses of variance and correlation analyses to determine the effects of the independent variables upon the dependent variables; (9) took advantage of the University of Pacific Laboratory of Educational Research and the Computer Center facilities to carry out the analyses and obtain a printout of the results.

RESEARCH HYPOTHESES

Hypothesis 1

Lower achieving intermediate grade migrant children who receive paraprofessional assistance in (1) reading and arithmetic or (2) reading alone show greater gains in achievement than migrant children who receive (3) no paraprofessional assistance in arithmetic or reading as determined by pretest-posttest gain scores on the Comprehensive Test of Basic Skills (CTBS) in (a) arithmetic and (b) reading.

Hypothesis 2

Girls who receive paraprofessional assistance show greater gains in achievement than boys as determined by CTBS gain scores in (a) arithmetic and (b) reading.

Hypothesis 3

There are no differences between the grade levels in the amount of achievement gain as determined by the CTBS gain scores in (a) arithmetic and (b) reading.

Hypothesis 4

The lower the fifth or sixth grade migrant student's initial achievement level, as shown by his pretest quartile, the greater the gain in achievement as determined by the CTBS gain scores in (a) arithmetic and (b) reading.

Assumptions:

1. The migrant children and the paraprofessionals sampled in this study were representative of their respective larger populations.
2. The procedures used in the collection, summarization and analysis of the data were adequate for the purposes of this study.
3. The carefully outlined procedure of this investigation has provided the means for identical replication as well as replication with variations.

Limitations:

1. The study was limited to identified migrant children who were present for both pretest and posttest as well as for most of the 1971-72 school year in Fresno County. Those who migrated within the school year were not included.
2. The study was limited to measuring changes in achievement level by means of group testing on the Comprehensive Tests of Basic Skills. Affective changes which may have occurred were not measured.
3. The study was limited to intermediate grade migrant

> children who were designated as lower achieving as determined by their pretest grade equivalent scores.

DEFINITIONS OF TERMS

Terms applicable to this study were defined as follows:

Migrant Children: Strict identification procedures were followed as required by the federally funded Migrant Education Program. Spanish-speaking community aides verified by personal conversation that the head of the household was employed in farm labor in order for the children to be designated as migrant children. Additionally the children's education must have been interrupted with the preceeding school year for them to qualify for educational assistance.

The term "migrant children" has been defined by Leo R. Lopez, Chief of the Division of Compensatory Education of the State of California Department of Education as children of migratory workers.

> A migratory agriculture worker is an adult worker who is employed in temporary or seasonal work in the production or harvesting of fruit, vegetable, feed or fiber crops, or in related food processing occupations of a temporary or seasonal nature. In order to be classed as migratory, such worker must have moved at least once within the past year, from one state to another, or from one school district to another for the purpose of seeking employment in, or being employed in such temporary or seasonal agricultural work.[1]

Paraprofessional. Brighton (1972:30) defined the paraprofessional aide as,

> a person who has less than the required or expected level of education or training, but who is performing duties usually performed by a professional, under the direct supervision of a certified person.

---

[1] Leo R. Lopez. Memo to Regional Directors of Migrant Education. April 9, 1971.

The thirty-five paraprofessionals involved in this study are described as follows: all were female but one; most were high school graduates, a few had a year or two community college; many were married with children attending the school where they were employed, and most were Spanish-speaking. Hours of employment varied from three to seven hours a day. Wages were at the minimum level mostly under two dollars per hour. Approximately sixty hours of preservice and inservice training in the use of materials, activities, and techniques of working with migrant children were provided by resource teachers and curriculum specialists. Throughout the school year paraprofessionals were supervised, guided, and encouraged by classroom teachers and resource teachers.

Paraprofessional Assistance: Under the guidance of the classroom teacher and resource teacher the above described persons gave instructional aid to migrant students individually and in small groups usually on a daily basis. Ranging from fifteen minutes to forty-five minutes the average tutoring period lasted about twenty minutes per day per subject. The size of the group receiving assistance varied from one to six students, averaging about three.

The amount of assistance received by a migrant student was dependent upon a number of factors: (1) the number of paraprofessionals hired by the school district, their hours of employment, and their daily schedules, (2) the priorities set by the school administrator who determined the grade levels and classrooms in which paraprofessionals were placed, (3) the priorities within each classroom as to which students had the greatest need in the teacher's judgment.

The kind of assistance accounted for in this study was limited to arithmetic and reading. Aid given by the paraprofessional was continually guided toward meeting the educational needs of the migrant child and his group as determined by the classroom teacher and/or the resource teacher. The quality of assistance did vary according to the talents and limitations of the paraprofessional, the classroom teacher, and the resource teacher.

Lower Achieving Students. For the purposes of this study these were students who scored two or more months below grade level as determined by grade equivalent scores on the pretest of the Comprehensive Tests of Basic Skills in reading and arithmetic achievement. Specifically lower achieving fifth grade students were those whose grade equivalent scores were 4.8 and below. The median scores of this group were 3.4 in reading and 3.7 in arithmetic. Lower achieving sixth grade students were those whose grade equivalent scores were 5.8 and below. The median scores for the sixth grade group were 3.8 in reading and 4.5 in arithmetic.

Lower achieving identified migrant children constituted the controlled variable of this investigation.

SUMMARY

Chapter 1 presented an introduction to the investigation of the effect of paraprofessional assistance on the academic achievement of migrant children. Migrant children are multiply handicapped by: irregular attendance and a lack of continuity in their schooling, economic and social deprivation, and greater than average health problems. Linguistic and cultural differences complicate their problem. Migrant children suffer a lag in academic achievement. Paraprofessional assistance has been proposed as a possible means of helping to solve their educational problems. In addition to the problem statement, Chapter 1 presented the significance of the problem, the research hypotheses, an overview of the procedures, the assumptions and limitations, and the definitions of terms.

Chapter 2 presents the review of the literature, Chapter 3 the design and procedures of the study. Chapter 4 the results of the study, and Chapter 5 the summary, conclusions and recommendations.

Chapter 2

REVIEW OF THE LITERATURE

Selected literature pertaining to this study has been organized into five major areas: (1) migrant children, (2) migrant education programs, (3) differences in achievement related to the sex of the student, (4) tutoring by other non-professionals, and (5) paraprofessionals and pupil performance.

Each of these areas is reviewed separately in an attempt to answer the following questions: What are the unusual characteristics of migrant children which make it difficult for them to achieve well in our educational system? What other attempts have been made to meet the special needs of migrant children? Are differences in achievement related to the sex of the student? What has been the effect of tutoring by other non-professionals on low achieving students? What influence have paraprofessionals had on pupil performance? These questions have been asked in order to focus the review of the literature and create the context of previous research from which this study evolved.

MIGRANT CHILDREN

What are the unusual characteristics of migrant children which make it difficult for them to achieve well in our educational system? Literature relating to this topic is discussed under the following headings: (1) migrancy, poverty, and health, and (2) cultural and language differences which stem from a Mexican heritage.

Migrancy, Poverty and Health

Characteristics of migrant population were briefly described in Chapter 1 under definitions of terms and introduction to the study. Following are further descriptions of the migrant population in general and migrant children in particular.

Characteristics of the migrant population. In a description of a large segment of the migrant population in Southwestern States Orr (1965) found the following characteristics: Eighty-five percent had Spanish-American ancestry; the average family contained six children plus related adults; family unity was very strong, they tended to seek employment for the entire family including older children; camps and homes were substandard; educational level was very low; their subculture was not easily compatible with "accepted" values of the dominant culture; their income level was low consequently they were preoccupied with making a living; they were not fervent about religion; and they were very "present" time oriented.

Rodriquez (1967) supported Orr's picture of Mexican-American migrants in his descriptive study which showed migrants to be: of low level education and income, and satisfied with farm work. Additionally Rodriquez found a feeling of alienation from the dominant society.

Ritzenthaler (1971) found that migrant children attending high schools in New Jersey were three to four years behind the average high school student in the area of reading level.

In an analysis of the education of children of migrant agricultural workers in Arkansas, Barnes (1971) found in data received from the "uniform Migrant Student Transfer Form" that seven percent were non-readers, 56 percent were below average, 35 percent average and 3 percent skilled. On a standardized achievement test migrant children averaged 1.3 grades below grade level.

A description of migrant children by the California State Department of Education (1971) succinctly summarizes the plight of migrant children:

> Coming from the least affluent segment of American society these children move frequently, attend school irregularly, and suffer health defects and language handicaps which result in significantly retarded progress in school. In general their rate of progress has not been more than .7 month for every month spent in school. This retardation is cumulative and eventuates in most becoming early school leavers, poorly prepared for economic success or upward social mobility.

Living conditions and migrancy. Home for the migrant child is often a temporary shelter, more like a simple summer cabin or camp. The great difference is that this temporary shelter in one community after another is the permanent condition of home so long as the child's family continues to follow the crops. Each family follows a crop calendar of its own. The people who come together for any one crop activity will have come from many localities. They will disperse again in as many directions arriving and departing all through the busy season. Some families follow a regular route, returning each year to the same areas and even the same farms and same schools. These are the few families which are on their way to establishing permanent residences making only one or two moves a year and returning to the home base. (Martin and Wood,1955).

For some migrant families part of the year is spent in Mexico either as a home base or for extended visits with relatives. The colder winter months when work is scarce finds a number of Mexican-American migrant families including Mexico in their travels. Many Mexican-American families maintain close ties to the mother country. For these children the school hurdle becomes higher. The task becomes one of growing up in two cultures and with two languages. The Mexican-American child comes to school with Spanish ringing in his ears. He eats a Mexican breakfast and dinner but an American lunch in the school cafeteria. He lives in a precarious balance between the values of the home and the values of the school. (Martin and Wood, 1955). These authors' description of the living conditions of migrant families in 1955 remained little changed at the time of this writing.

Migrancy and schooling. Frequent moves and irregular attendance affect the migrant childrens' progress in school. Haney (1966: 265) discussed a number of reasons why migrant children do not attend school regularly:

> The parents' lack of education or their attitude toward the importance of education for their children; their need for the children's earnings or for older children to care for their younger brothers and sisters while the mother works in the field; and the language barrier in areas where Spanish-speaking migrants are working.

Haney explained that migratory pupils are not educationally retarded because they lack intelligence or ability, but because they lack the opportunity to attend school regularly and to receive a continuous program of education. Schooling is lost each time the family moves. Studies indicate (Haney, 1966) that most migrant families do not spend more than five, or at the most seven months, in any one place.

Social mobility as reflected in frequency of change in schools adversely affects reading achievement among disadvantaged and lower socio-economic-group elementary-school pupils. This evidence was reported by Justman (1965) in a study of over 900 children in New York City.

Schooling for the migrant children lacks continuity and this in turn affects their feelings about school and their ability to perform well. They are hampered additionally by lack of opportunity to build close and lasting friendships outside of their family circle. Kirby described these handicaps:

> They are deprived, as well, of the opportunity to develop a sense of belonging to a class, a school, a town or perhaps even a country. Their families rarely experience much involvement in the life of any town. Mexican-American migrants tend to not become Americanized. (Kirby, 1969:44).

Migrant children are often cognizant of the fact that because of their abbreviated school exposure they have fallen behind in their academic endeavors (Mangano and Towne, 1970). Mexican-American youth tend to see themselves in a less favorable way than the normative population revealed Palomares and Cummins (1968). These investigators reported that Mexican-American children in rural communities consistently projected an adequate sense of "personal worth" within their own subculture; however, when they were required to compete in a different culture their self-concepts seemed permeated with feelings of inadequacy.

The Mexican-American child's achievement is affected by home background. Acosta (1972) reported four highly correlated home environmental variables which were significant factors contributing to the successful remediation of reading disabilities as measured by the Stanford Achievement Test. In his study of third grade Mexican-American children Acosta found these factors to be: parents' degree of acculturation, income level, educational aspiration, and occupational desires for the child.

Socio-economic status, social mobility, home and parental influences, and bilingualism were high on the list of environmental influences on reading achievement described by Harris (1969) in a discussion of the conditions affecting reading.

Poverty permeates the migrants' life. Migratory farm workers are part of the least affluent segment of American society. Edwards (1960) described them as being "at the bottom of the barrel, economically, socially and educationally." They are people who cannot earn enough to exist if they stay home. It is difficult for migrants to pull themselves out of their wandering life, stated Edwards for almost wholly they are members of minority groups, handicapped by language or racial barriers as well as by poverty, ignorance, and often hopelessness.

Reul (1970) described the migrant as bringing with him distinctive values, attitudes and beliefs which are relevant to his work achievement and his motivation for himself and his family. Reul stated: "The migrant farmworker is a part of a distinct subculture in American society. Its most obvious feature is poverty."

Poverty was labeled a "crucial issue" by Bruner (1971) in a discussion of conditions for educational equality. Bruner described the culture of poverty as a prevailing feeling of powerlessness. In comparing children from different socio-economic backgrounds he found a major source of cognitive difference lying in goal setting and attainment. Middle class children, Bruner explained, are more highly motivated toward achievement than are lower class children.

Kneller (1967) described lower class minority children as lacking the drive toward academic achievement which middle class children readily accept.

In a statement made before a senate committee hearing on equal education opportunity, Guthrie (1969) reported:

> Schooling provided to an individual and his subsequent educational achievement and post school performance are determined to a substantial degree by his social and economic circumstances.

Health problems of migrant children. The children of migratory farm workers have been found to suffer from an inordinate number of health problems. In an evaluation report of migrant programs Benner and Beckett (1969) stated:

> It is unreasonable to expect that children debilitated by disease or malnutrition, or suffering from carious teeth, or whose eyesight or hearing is impaired, or those with severe psychological problems can progress academically at a rate comparable to those in vigorous good health.

Migrancy and poverty with its accompanying deprived living conditions, and inability or reluctance to seek adequate medical care have resulted in unresolved health problems for many migrant families. What are the special health needs of migrant children? Holmes, the coordinator of health services of the program involved in the present study gave the following definitions of health and related them to the migrants' predicament:

> Health, as defined by the World Health Organization, is a state of complete physical, mental and social well being. It is a condition for optimum growth - physically, mentally, educationally and socially.
>
> Health, to many school personnel, is a state or absence of disease or infirmity.
>
> Health, to many migrant parents, is a state of being free from pain. (Holmes, 1972).

An office of education bulletin described health problems:

> The children of migrant farm workers are born into some of the worst poverty in this country . . . . These children suffer from illnesses such as rickets, scurvy, pinworms, anemia, tonsillitis, and protein deficiency. (U.S. Department of HEW: 1970).

The realization that health problems stand in the way of school learning prompted the planners of the state and local migrant education programs to include supplementary health services as one of the program's primary objectives. Accordingly the planners of the Fresno County Migrant Education Program, designed "Health Roundup Night Clinics" to deliver health care to migrant families. On scheduled Wednesday nights 23 of these clinics were held at centrally located school sites during the school year. The purpose of these clinics was to identify health deviations of the children and quickly provide immediate care as well as follow up care. Nurses and paraprofessional health aides conducted the clinics under the supervision of a dedicated pediatrician. Migrant families, personally invited to attend these clinics, resulted in 73 percent attendance by the families canvassed. Nearly 3,000 children were examined by nurses during the 1971-72 school year.

Health appraisals under this program included a family and student history, review of immunizations and a nursing assessment. The nursing assessment included hearing, vision, hemoglobin, urinalysis, and tuberculin tests. Assessment was completed in the area of eyes, nose, throat, skin, dental, abdomen, chest, extremeties, spine, and soft neurological areas. Further tests involved the throat, ears, heart, lungs, blood pressure and pulse. Additional tests were done on acutely ill children. During the evening of the clinic as well as throughout the school year nursing intervention of minor problems were carried out, standard immunizations given and referrals were made to the pediatrician or outside physicians.

A summary of the findings of the health assessments revealed that of the nearly 3,000 children screened or tested 52 percent had documented medical problems. It was reported that 93 percent of these were corrected or follow up care was initiated. In the dental category 46 percent were referred and 53 percent were corrected. Health needs of migrant children becomes quite apparent when one considers that 52 percent of the children screened were found to have some referable physical health problem capable of impairing their ability to learn.

Cultural and Language Differences Which Stem from a Mexican Heritage

The vast majority of California's migratory farm workers are Mexican-American. What educational difficulties do migrant children encounter which are related to their linguistic and cultural differences? Is a child's progress in school influenced by such differences as speaking a foreign language, having recognizable physical characteristics, and exhibiting customs unlike those of the dominant culture? Is the lag in academic progress necessarily caused by these characteristics or rather by the kinds of experiences such children find in the schools they attend?

"The Mexican-American has maintained his mother tongue longer than has any other minority group," stated Bernal (1969) former classroom teacher, social worker and state senator from San Antonio, Texas. Bernal described a Texas high school where 98 percent of the students were Mexican-American. The scene described by Bernal pictured a

Mexican-American student about to receive corporal punishment for having spoken Spanish in the classroom.

Although Bernal's journal article appeared in 1969 the situation described is not unheard of today. This investigator found that Mexican-American students in many classrooms were discouraged from speaking Spanish if not reprimanded for doing so.

In most instances Mexican-Americans speak both Spanish and English. There is a wide range of bilingualism varying from almost no English to very little Spanish. Smart (1969) suggested that the degree of bilingualism in the home may have important implications for school programs. She suggested the need for further research in this area.

Justin (1970) stated that speaking a foreign language and holding to a culture which is quite different from the dominant culture is sure to subject a minority group to discrimination. Brown skin and different customs distinguish the Mexican-American from the Anglo majority. Justin concluded that the combination of differences in language, customs and skin color add to the possiblity of discrimination against the Mexican-American. Different cultural values from those of the white majority were similarly described by Schwartz (1969). In brief they involved emphasis on present over future needs, fatalistic feelings that man has little control over his environment, and a decided emphasis on interpersonal relations over material acquisitions.

Landis (1963:341) described the Mexican culture as more authoritarian than the middle class Anglo-American. "Mexican children are expected to wait for adult direction, usually that of parents or elder siblings, rather than to exercise their own initiative."

Carter (1970) described the culture of the Mexican-American family which had its beginnings in the old country Mexico. The male dominates over the female to a greater extent than in the Anglo-American culture. The father's male role has its influence on the boys in the family. The oldest son inherits the father's authority, particularly so at the point of the father's death. Young males are encouraged to establish a strong masculine image or "machismo." The young man is truly "macho" (male) when he is earning money on his own.

Many of cultural differences found in Mexican-American which contrast with the dominant Anglo-American culture have resulted in a cultural conflict detrimental to the Mexican-American. Rivera (1970) suggested that the best solution to this cultural conflict is for the schools to help Mexican-Americans feel pride in their ethnic background. A strong sense of identification is better developed when individuals feel pride in their ethnic background. Cultural pluralism is a positive solution because individuals can identify with their ethnic culture on one hand and still feel they are good American citizens on the other hand. Carter (1970) and Bernal (1969) reiterated Rivera's suggestions stressing that our schools should teach Mexican-American children about their culture, language, and heritage.

Carter (1970) characterized the Mexican-American as benefitting little from our present educational system. However, Carter reported that these students do perform better in schools where there is a low percentage of minority group children. Carter found Mexican-Americans having one of the highest drop out rates found among ethnic groups in the United States.

The Mexican-American child and the demands of our educational system.

American children whose native language is Spanish and whose cultural backgrounds are different from that of the dominant culture have found difficulties in achieving at the level of the dominant society. Have the schools themselves contributed to the Mexican-American educational difficulties?

"Neglect of Mexican-American students" was the accusation made by Commissioner Manuel Ruiz in announcing the findings of a 1970-71 Civil Rights study. The report, described by Del Olmo in the Los Angeles Times (1973), involved schools in California, Texas and New Mexico. "Anglo students were found to receive more positive teacher attention than Mexican-American pupils," said a spokesman for the U.S. Commission on Civil Rights. This comparative neglect of Mexican-American youngsters is "likely to hinder seriously the educational opportunities and achievement of Chicano pupils," according to the official commission report. (Del Olmo, 1973).

The more important findings of the study were: (1) teachers praise Anglo students 40 percent more often than Mexican-American students, (3) teachers "respond positively" to Anglo students 40 percent more often than to Mexican-Americans, and (4) teachers direct more questions to Anglo students 20 percent more often than to Mexican-American youngsters. Information for the commission's study was gathered by interviews and first hand observation in classrooms. The Flanders System of Interaction Analysis was used to interpret the data. The poor pattern of interaction between Mexican-American students and their teachers "only mirrors the educational neglect of Mexican-American students found throughout the educational system," Ruiz said. (Del Olmo, 1973).

Manuel (1965) summarized the educational problems of Mexican-

American students in five southwestern states:

> Entering school, they have more to learn than their Anglo-American classmates, a second language and other knowledges and skills foreign to their homes. They cannot start their schooling at the level already reached by English speaking children. Starting behind and facing greater handicaps, the Spanish-speaking children tend to fall farther and farther behind with advance in grade. The progress of many is hindered by poor attendance resulting from the poverty of the home and the ignorance of their parents. Many find the going too hard, in part because the school program is not adapted to their needs, and drop out when age permits them to do so. (Manuel 1965:36).

Plakos (1967) in a report on the progress of the Mexican-American Research Project described the school problems of Spanish-speaking children from low-income families. Plakos listed the failure producing condition:

> (1) a lack of experiences out of which concepts may grow, (2) an inadequate command of the English language which is the language of the instructional program; (3) a lowered self-confidence resulting from repeated frustration and failures, and (4) an unrealistic curriculum which imposes reading and writing requirements in English before skills in listening comprehension and in speaking fluency have been accomplished. (Plakos 1967:1).

Mexican-American children whose native language is Spanish and whose cultural backgrounds are different from the traditional school culture upon which the curriculum is based may be expected to experience difficulty in meeting the demands of the school world.

Summary

The characteristics of migrant children which have made it difficult for them to achieve well in our educational system were described under the following headings: (1) migrancy, poverty and health with subtopics: characteristics of the migrant population, living conditions and migrancy, migrancy and schooling, poverty permeates the migrants' life, and health problems of migrant children, (2) cultural and language differences which stem from a Mexican heritage with the subtopic: the Mexican-American child and the demands of our educational system.

Attempts at meeting the special needs of migrant children are discussed in the following section on approaches to migrant education.

MIGRANT EDUCATION PROGRAMS

In order to tie the present study into the whole migrant education picture, common threads which appear in the many and varied programs have been searched out. Similarities and differences in a number of representative migrant education programs have been examined. It was found that nationwide the approaches to migrant education have been quite diverse. Educators looking for some simple accepted system, some easy formula for solving the educational dilemma of migrant children will be disappointed. The search is still going on.

The 1966 Migrant Amendment Gave Impetus to Migrant Education

The availability of federal funds made possible an attack on the problem of meeting the educational needs of migrant children. Impetus began in 1966 with the passage of the Migrant Amendment which was added to the Title I, disadvantaged, section of the Elementary and Secondary School Act. By 1971, 47 states had begun to identify their migrant population, assess their needs and plan educational programs for migrant children and youth. In 1971 over 51 million dollars were allocated to migrant programs by the federal government. Migrant programs were federally funded, state administered, and locally operated. Thousands of professionals at these three levels of government were involved in a massive effort to come up with optimum educational programs for the migrant children and youth.

Great quantities of literature came out describing various stages in the development of migrant programs. The initial step for each state and regional agency was to identify the migrant population in their area. The status of the education of these migrant children was assessed. The specific school districts within each geographic area affected by migratory children were listed. Data was gathered, the number of migrant children identified, and periods of high impaction determined.

The second step in the development of migrant education programs was to assess the needs of migrant children and youth. Descriptions of migrant children as detailed in the preceeding section were confirmed over and over again as each migrant project was read by this researcher. Here was an area of agreement. Many of the problems of migrant children appear to be common to most economically restricted groups. They are heightened by migrancy and irregular school attendance. They are complicated by bilingualism in the case of Mexican-American migrants. They are made worse by prejudice when migrants' skin color differs greatly from that of the majority group.

Although there was an area of agreement as to the characteristics of migrant children, there was great variety in approaches to meet the needs of these children. There were differing program emphases depending upon whether importance was placed on one need or another. The gamut swung from emphases upon self concept, to lessons in hygiene and sanitation, from radio broadcasts to peer-produced books. The vast assortment of projects had some things in common: there was agreement on the need to give special attention to the problems of migrant children, the need to get these children in school, to gain their confidence, and to provide them with appropriate learning experiences.

The Present Study and the California Plan for the Education of Migrant Children

In order to understand the present study, it is important to realize its relationship to migrant education programs in general and the California Plan in particular. How does the present study fit into the picture?

The California Plan.

The California Plan for the Education of Migrant Children was operated by the California State Department of Education a Division of Compensatory Education, Bureau of Community Services and Migrant Education with the cooperation of the school districts and county superintendents of schools.

The State was divided into seven multi-county regions in order to administrate services to migrant children. These regional divisions constitute major crop areas having high concentrations of migrant farm workers. In each of the seven regions the California Plan was implemented to provide a program of supplementary educational services to meet the special educational needs of migrant children. Under this plan the state administered federal funds and provided the following services to benefit migrant children: (1) curricular activities and instructional services to supplement the regular programs of instruction provided by the public schools for all children, (2) health and welfare services, (3) preservice and inservice education of personnel and, (4) supportive services necessary to the success of the programs.

Each region in California carried out these services through the local education agency in programs which differed slightly from those of other regions because of local circumstances.

Region Four of the California Plan. The present study was concerned with one aspect of the educational component of Region Four. In 1971-72 the Region Four Migrant Education Program attempted to meet the needs of 6,000 migrant children who concentrate in Fresno County during certain periods of the year. Tenuous and limited funding made it difficult to accomplish this. The present study was designed to take advantage of the fact that not all of the migrant children in the region were being served.

In spite of massive efforts made by the State of California to reach all of the estimated 80,000 school age migrant children, in 1970 a large number still had not been served according to the U.S. Department of Health Education and Welfare (1970).

The Region Four approach to migrant education emphasized the combined efforts of resource teacher, classroom teacher and paraprofessional to give educational assistance to migrant children. The regular curriculum was supplemented with special materials and activities provided through the resource teacher from the regional office. Special emphasis was given to language development, communication skills, reading, and mathematics. Small group and individual assistance was given to migrant children by the paraprofessional.

Regional variants in the California Plan. Not all approaches to migrant education within the State of California were the same. Variations were pointed out in a study by Beckett (1973) which contrasted Region Four with an unidentified region of California.

During the 1971-72 school year data was gathered on pretest and posttest scores for reading and mathematic achievement. Migrant children from two regions received supplementary educational services by different approaches. Group one children (Region Four) received supplementary support through a team approach. This approach utilized trained paraprofessional tutors assigned to specific migrant children who assisted them under the direction of the classroom teacher. A resource teacher gave support and continued inservice training in individualized instructional methods.

Children in group two received supplementary educational services from the several school districts where they were enrolled. The districts provided "pull out" programs involving "specialist" teachers. Language development, remedial reading, and English as a second language were part of the program. Teacher aides were used in this program.

The costs per child in these contrasting groups were comparable. Costs for group one averaged $384 per child and for group two children $380. Health services which were also provided both groups of children were not included in this amount.

Test results for the two groups showed an important difference in gain scores. Scores in reading for group one children showed a mean gain of 5.7 months for the five months period between the pretest and posttest. Scores in reading for group two children showed a mean gain of 1.3 months for the five month period. In mathematics group one children achieved a mean gain of 5.8 months as opposed to a group two mean gain of 2.0 months in the five month period. Based on achievement test results it appeared that the better approach was that used with the children in group one - the team of resource teacher, classroom teacher and the paraprofessional tutor.

The present study and Beckett's study. If Beckett's study appears familiar to the reader, it is because his group one children included, along with grade levels two through eight, the fifth and sixth grade migrant children who were the subjects of the present study. Both studies involved the same 1970-71 data printouts. The studies compliment one another in that both had the goal of demonstrating the value of using paraprofessionals to give individual and small group assistance to assigned children under the close supervision of the classroom teacher and guidance of the resource teacher. Both Beckett and this investigator believed this approach made an ideal use of the paraprofessional.

The differences between the studies were: Beckett was contrasting the "ideal" use of the paraprofessional described in the Region Four Proposal for the Education of Migrant Children and a quite different use of the paraprofessional which took place in an unidentified region in California. The present study contrasted the same "ideal" use of the paraprofessional with those situations where the paraprofessional was unavailable to give assistance. The present study was limited to Region Four Fresno County and was confined to an in depth examination of the data for lower achieving intermediate grade migrant children.

Other phases of the California Plan. Under the California Plan for the Education of Migrant Children the Uniform Migrant Record Transfer System allowed information concerning each migrant child's current health and educational records to be received by the local school district when the child enrolled. A data bank in Little Rock, Arkansas stored this information on a nationwide basis. Retrieval of stored information as well as updating of these records was possible by teleprint connection between the regional centers and Little Rock. When the migrant child left a local school his records were updated and sent to the data bank. When he enrolled in a new school in any region within the State or in other states where migrant programs are in effect his records were quickly available through this unique retrieval system.

Additional supplemental services of the California Plan included health services, home-school-community liaison services, preschool programs, and staff development programs.

Two exemplary activities of the California Plan were the Migrant Teacher Institutes and the California Migrant Teacher Assistant Mini-Corps.

In the Mini-Corps program disadvantaged college students were selected on the basis of previous family association with migratory farm workers to participate as migrant teacher assistants. The Mini-Corps was started in the summer of 1967 with young people from Chico, Fresno, and San Jose State Colleges. The objectives were threefold: (1) to encourage former migrants to continue in college, (2) to increase these college students' interest in teaching and (3) to provide a well trained group of teacher assistants. It was hoped that these young people would assume the role of inspirational models for Mexican-American youngsters.

In addition to their work as paraprofessionals in the instructional program, Mini-Corpsmen assisted in after school programs, assisted in English as a second language programs, worked as community aides with parents.

From the migrant student's viewpoint the Mini-Corpsmen were models about whom the student could say, "He's a Mexican like me. His family is like mine and he's a teacher." (Benner and Reyes, 1967).

The Migrant Teacher Institute provided for an intensive course of instruction in principles, problems, and practices of teaching migrant children. The course was offered at five California state colleges in 1968. An on-campus session of two weeks was followed by supervised practical experience during the summer program held in cooperating schools. A two day critique concluded the program at the end of the summer school. (California State Department of Education, 1969).

Outside of California other approaches to migrant education have been undertaken. In order to put the present study in perspective, some other programs have been examined. Common elements found in these varied approaches have been indicated.

Variations in Migrant Education Programs

From the large number of migrant education projects reviewed by this researcher certain ones appeared to typify the variations in approach. Programs from Texas, Arizona, Virginia, Oklahoma, Wisconsin, New York, New Mexico, New Jersey and Florida are presented along with two surveys of migrant education programs.

Migrants in the State of Texas follow the peculiar pattern of six months in their home base and six months of migrancy. As a result of identifying the need for compressed schooling the Texas Education Agency (1967) created the six months school project. An enrichment program was built on the base of the regular school day. After the termination of the regular school day an extra one to one-and-a-half hours was spent on additional oral language development. The student to teacher ratio was fifteen to one. Additionally during the regular school day extra remedial personnel were hired to help migrant children with their work in groups of twelve or less.

Another Texas six months plan was reported by Croft (1967). The migrant school was in session from November when migrant students return to their home base, until April when they leave to follow the crops. The school day began at eight A.M. and extended to five P.M. for six days per week. Only four holidays were included in this academic school calendar. Croft indicated that, as of 1967, forty schools housing 3,200 migrant students located in the Rio Grande Valley were using this modified school calendar.

Arizona's migrant population is nowhere near the size of Texas or California's. Migrant camps in Arizona are busy year around, so the emphasis has been on specialized services and activities for migrant children during the regular school year.

What Arizona has accomplished to modify traditional education for migrant children is best illustrated by the demonstration school in Somerton. A program in how to meet the special needs of migrant children was started in 1967 with the aid of Arizona State University's Reading Center. Summer schools were set up offering six units of college credit for teachers of migrant children. During the regular school year the demonstration school continued. Emphasis in the Arizona program described by Skinner and Brunstein (1968) were: (1) pre-first grade language experience and readiness program, (2) three ungraded primary classrooms, (3) health programs, (4) cafeteria breakfasts and lunches, (5) a resource center, (6) intermediate and junior high school programs and (7) inservice training program for the teachers of migrant children. The language-experience approach to reading instruction was stressed as well as the unit plan whereby students created their own resource books.

Following the theme of an ungraded flexible program was the Virginia program for migrant students described by Conyers (1968). The program, flexible and ungraded, involved out-of-door experiences as well as academic ones. A teacher's aide worked alongside each teacher. Breakfast, lunch and a 4:30 P.M. supper were included in this informal summer school program.

The Oklahoma State Department of Education emphasized language development with an unusual approach using a linguistic laboratory program for migrant children in grade 1-4. Classes were held after school hours and Saturday mornings. The laboratory was staffed by an instructor, laboratory aide and part time secretary. The laboratory was equipped with films and records in English and Spanish. Numerous pieces of audio-visual equipment included films, tapes, and records in English and Spanish. (Schnur, 1970)

Wisconsin State Department (Schnur, 1970) stressed communication skills above all others. The State of Wisconsin was guided by three goals in planning educational programs for migrant children: (1) to increase familiarity of school staff with the problems and needs of migrant children, (2) to develop a curriculum emphasizing communication skills, and (3) to build a school environment which facilitates the development of communication skills.

New York State summer schools for migrant children gave emphasis to language abilities in one out of five objectives. Garofalo (1968) investigated migrant education summer programs in New York State to determine whether they were achieving the State's objectives for migrant education. Although statistical tests of significance were not used Garofalo found that as measured by objective tests the 495 subjects averaged 150 to 230 percent above that which was expected in a six week's period. The objectives investigated were: (1) improvement in self concept, (2) development of social and academic skills, (3) development of language ability and vocabulary, (4) expansion of cultural experiences and (5) establishment of sound health and nutritional habits.

The New Mexico Project stressed English communication skills for Spanish speaking migrant children. Southard (1967) described the project called "move ahead." Daily radio programs were broadcast to all schools. The programs were designed to be supplemental to regular language instruction. English communication skills for Spanish speaking youngsters were designed to improve student attitudes and raise aspiration levels through enforcement of self image in the child's cultural setting. Trained teacher's aides acted as radio broadcast monitors and tutors.

Caperton and Fitzpatrick (1967) described the overall New Mexican program as providing remedial instructional programs in English, mathematics, and English as a second language. Projects were designed to augment and compliment the curriculum of the school. Elements of success underlined all activities, and active participation of migrant children was sought. A program of home instruction was also developed in this project.

The importance of stressing communication skills with migrant children and youth was reiterated in a doctoral study by Ritzenthaler (1971). Migrant youth in New Jersey showed the need for a fresh new approach to language development to overcome their inability to respond well. A high school humanities program was created with its purpose to improve skills of communication, broadening experimental background and development of self-concept. Ritzenthaler stated:

> The rationale of this approach followed the concept that all communication stems from an inner language. Receptive language, listening skills that later become reading skills, and expressive language, speaking skills that later develop as writing skills, must be developed before any meaningful reading can take place.

The language and communication emphasis was carried out in full in Florida's Broward County where the language-experience approach was used to produce reading material for migrant children. A multi-sensory learning program developed by Dr. Ward Brunson resulted in "Peer-Produced" books. In their language experience approach to reading instruction children's stories were taped, typed, illustrated, and simply bound into books for others to read. The tape and books were placed on the shelf to be shared. (Stephenson, 1969).

Migrant Education in Surveys

In a survey of educational programs for agricultural migrant children Scott (1968) found that of the nearly 50,000 students polled approximately 40,000 were in elementary schools. Scott found the major curricular emphasis in most programs directed toward language arts with arithmetic, science and social studies receiving less attention.

In a synthesis of current research in migrant education Schnur

(1970) found that in programs dealing with intermediate grade migrant children the following emerged as the most effective activities based on endorsed usage: (1) English language, (2) English as a second language, (3) cultural enrichment, (4) physical education and (5) health services.

Other activities reported by Schnur as being used in a number of migrant programs were: certain types of individualized instruction, ungraded classrooms, emphasis upon verbal drill and oral conversation, student adjustment to daily problems, linguistic laboratory programs, peer produced booklets, and other special approaches in areas of language art and mathematics.

Schnur (1970) commented that migrant education is in its infancy. Much of the available material is of a descriptive or philosophical nature not supported by empirical evidence. Schnur pointed out that these studies, nevertheless, served the purpose of sensitizing an increasing number of citizens of our country to the plight of migrant children.

Summary

Migrant education programs were reviewed, the purpose being to relate the present study to others which were similar. However, it was found that great variation appeared among migrant programs and as Schnur commented above, much of the available literature was descriptive or philosophical rather than empirical in nature.

The present study took place in Fresno County. It was involved with one aspect of the educational component in Region Four, one of seven regions into which California has been divided for purposes of administering the California Plan for the Education of Migrant Children. Following the descriptions of several California plans, variations in approaches to Migrant Education in other states were reported. An outline of program's variations would include the following curricular emphases: individualized instruction, ungraded classrooms, English language, verbal drill and oral conversation, student adjustment to daily problems, linguistic laboratories, peer produced books, and other special approaches in areas of language arts, mathematics, and cultural enrichment. In general nearly every program for migrant children stressed the need to improve communication skills. Health care was a concern of most programs involving migrant children.

Although paraprofessionals were mentioned in some of the project summaries, few migrant education programs stressed the use of paraprofessionals as instructional tutors. Program summaries frequently gave little indication that paraprofessionals were even used in the program, the greater emphasis being given to innovative curricular plans. When full reports of migrant programs were examined the use of paraprofessionals in various capacities was mentioned; it was felt by this investigator that little importance had been placed on the fact that paraprofessionals were used.

DIFFERENCES IN ACHIEVEMENT RELATED TO THE SEX OF THE STUDENT

Are differences in academic achievement related to the sex of the student? It was hypothesized in the present study that girls would show greater gains in achievement than boys. Is this hypothesis in keeping with current literature findings? Literature related to sex differences and achievement is discussed in the following section.

In a survey of research on sex differences Tyler (1969) stated that it is a well-documented fact that girls do better in school than boys at least so far as teacher-rated achievement is concerned. On educational achievement tests sex differences are small but their directions are consistent from one study to another. Girls typically excell in English, spelling, writing, and art, boys in mathematical reasoning, history, geography, and science. However, Tyler stressed that the variability within each group in special ability tests is so large that practical significance of the differences between group averages is not great.

Stanchfield (1969) reported statistics from many schools indicate that boys have more difficulty than girls in learning to read. Large school systems report that at the upper elementary level the boys make up 75 to 80 percent of all reading disability. Enrollment figures from reading clinics show that boys compose over 85 percent of the students in classes for reading improvement.

Equally emphatic in this pronouncement was Horn (1969) stating, "Sex differences generally favor girls over boys in the whole language arts area, particularly in spelling."

Although there is no sex difference in general intelligence, girls achieve more than boys especially in reading and other verbal skills according to Macoby (1966).

Cardon (1968) found two boys to every girl classified as retarded readers.

Gates (1961) reported his findings about sex differences in reading ability. He analyzed the reading test scores of 6,646 boys and 6,468 girls in grades two through eight. The participants in the study were approximately typical in intelligence, scholastic aptitude, and other pertinent factors. The results showed that the scores of the girls were significantly higher than those of the boys at all grade levels. Gates felt that the poorer showing by the boys on the tests indicated an environmental rather than a hereditary explanation.

Ellis and Peterson (1971) sought to determine the effect of same-sex class organization on seventh and eighth grade students' achievement and other variables. Findings failed to yield significant differences which were attributed to the same sex grouping. However, it was found that girls tended to have received higher marks from teachers, achieved higher scores on achievement tests, and reported more favorable attitudes toward school.

Arnold (1968) found that in general girls received higher school marks than boys.

Although girls performed better on tests involving language skills, Flanagan (1969) concluded that most of the differences between test scores of boys and girls at the secondary level were small, and were more a matter of differences in interest. Flanagan's findings were based on the extensive testing done under "Project Talent."

Although numerous studies have reported sex differences, usually favoring girls, in reading achievement, it is by no means clear that such findings represent more than environmental differences according to Harris (1969).

Differences in achievement have not constantly favored girls. Cleveland and Bosworth (1967) found no differences between the sexes in any aspects of arithmetic achievement at the elementary school level.

Brickell (1971) in a study on the paraprofessional and pupil performance found no differences in arithmetic and reading achievement related to the sex of the student.

Singhal and Crago (1971) examined the effects of sex differences in the reading and arithmetic achievement of migrant children attending summer school in New York State Migrant Centers, as a total group boys and girls did not differ in achievement. What slight differences that were found involved arithmetic in the third, fourth and ninth grades and these favored the boys.

Summary

Small achievement differences favoring girls over boys were reported with great consistency. A number of studies showed boys having more reading difficulties than girls. Girls appeared to receive higher marks from teachers and exhibited more favorable attitude toward school. Boys slightly exceeded girls in arithmetic achievement in a study involving migrant children. No differences were found between the sexes in a large study involving paraprofessionals. In general the differences found between boys and girls were slight - a number of writers attributed these slight differences to environmental factors.

It would appear that the hypothesis that girls would show greater gains in achievement than boys was in keeping with findings in the literature.

TUTORING BY OTHER NON-PROFESSIONALS WITH LOW ACHIEVING STUDENTS

Are the academic problems of low achieving students so intricate and complex that real assistance can be provided only by professionally trained teachers? Or can non-professionals such as fellow students, college students, parents, senior citizens or other volunteers who have not had years of formal education make important contributions to the educational achievement of these students?

Tutoring programs, particularly those designed for low achieving pupils, have been increasing in recent years. In a review of tutorial studies Rosenshine and Furst (1969) found few carefully controlled studies. Many of the recent studies found by this investigation were evaluated subjectively by the writers.

An increasing awareness of the value of tutors in the area of reading remediation was expressed by Criscuola (1971) as he quoted Walter W. Straley chairman of the 1971-72 National Reading Council:

> We need ten million tutors by the end of the 1970's since there are millions of elementary school pupils, as well as a portion of our adult population, in urgent need of reading remediation.

Literature related to non-professional tutoring, exclusive of paid paraprofessionals, is discussed under the separate headings of student tutoring and tutoring by college students and other adults.

Student Tutoring

Cloward (1967) aptly described the special empathic abilities of disadvantaged student tutors:

> The young tutor's ability to understand and communicate with low-achieving children in his social and economic group help to compensate for the tutor's lack of a higher education and knowledge of pedagogical methods. (Cloward, 1967:14).

Thelen (1969) pointed out the benefit derived by the tutor as well as the tutees. The tutor develops his own academic skills and understandings as he employs them to teach another. The teaching role is changed from one of transmitting knowledge to the role of helper who facilitates learning; cooperation replaces competition according to Thelen.

Tutoring by high school students. Cloward (1967) studied the effect of slum area high school students tutoring low-achieving fourth and fifth grade students in reading. The central issue of his report, declared Cloward, was whether students who have not completed high school can serve effectively as tutors. The tutorial program employed tenth and eleventh grade student tutors whose ethnic characteristics were similar to the elementary school duties. Tutors were paid for six hours of tutoring and two hours of inservice per week. The tutoring sessions included assistance with homework assignments, reading, games and recreational activities. Tutors escorted their pupils home following these after school sessions.

Findings of Cloward's study indicated that tutorial assistance resulted in significant reading improvement by the tutees when provided for at least four hours per week in two sessions. The group tutored for one session showed slight improvement over the control group. The tutors themselves also demonstrated significantly more improvement than control groups on three subtests dealing with reading comprehension and study skills. Additionally, Cloward reported some indication that sex-ethnic matching of tutors and tutees affected tutee reading achievement positively for negroes.

Cloward (1967:24) concluded:

> Tutors do not need 12 years of formal education and extensive training in reading pedagogy. Nor need they be highly successful in their own work. The average high school student can learn to be an effective tutor.

Hassinger and Via (1969) report the results of a tutoring study done in six school districts in Los Angeles County. The tutors were "disadvantaged" high school students who were two to three years retarded in reading, potential school dropouts, or unemployed high-school graduates. Fourth, fifth, and sixth grade underachieving elementary school students were tutored in reading in two-hour blocks for six weeks. Each tutor was given instruction in the use of audiovisual equipment, basic reading material, and in the practice of word games and other "high interest devices." Teacher-supervisors spent four hours per day for four days planning with the tutors and physically organizing each classroom for the tutoring experience. Hassinger and Via reported a mean growth for all tutees of 4.6 months in reading during the six-week program period on the Stanford Reading Test. Control groups were not mentioned and statistical comparisons were not made.

Werth (1968) studied the effects of tutoring in English on both tutors and tutees, using 32 high school freshmen classified as low achievers and 30 low achieving high school seniors who served as tutors. Tutoring was conducted during the regular English class period, one day a week, for one school semester. Thirty-two seniors and 32 freshmen in the same English classes served as controls. Criterion measures were difference scores (posttest minus pretest) on the Gates Diagnostic Reading Tests and the Language section of the California Survey of Academic Achievement Tests. The tutees made slightly better gains on the reading, language, and spelling tests, but the differences were statistically significant only on the reading tests.

The National School Public Relations Association (1972) reported the results of "The Neighborhood Youth Corps Program" then in operation in some fifteen cities. In this program older children sharply improve their own school performance while tutoring younger children. The association also described the "Mobilization for Youth" program in New York City in which older children tutored younger children who had reading difficulties. During a five month period, the tutees gained six months compared to a control group's gain of 3.5 months. Tutors gained an extraordinary 2.4 years compared to a control group gain of 7 months.

Criscuola (1971) described successful tutoring by fifty high school students who worked with third grade youngsters after school four days a week in six inner city schools. This "Youth Serving Youth" program involved inservice programs and supervision by a trained community tutor. Empirical data was not included.

Successful tutoring was described by Brown (1965). The "Learn and Earn" program in Florida used high school age aides to assist younger migrant children. Remuneration was given the older migrant students with the intention of keeping them in school by lessening their financial hardships. A statistical evaluation was not given.

Remarkable growth was made by both tutors and tutees in a six weeks summer tutorial program described by Landrum and Martin (1970). Tutoring was done by low-achieving drop-out prone junior high and high school students. Student tutors were given minimal training and were paid for their services. The tutees were disadvantaged children in the fourth, fifth, and sixth grades who were behind in reading. Participating school districts were impressed by the following results: at the end of the first summer tutors made an 8 month gain and tutees 4.6 months gain in reading achievement. At the end of the second summer tutors made 8.5 months gain and the tutees 4.8 months. The program has since been varied and expanded by some of the participating school districts.

Tutoring was effective in increasing arithmetic achievement with an emphasis upon computation in a project described by Burrow (1970). Older volunteer students tutored younger students in arithmetic. In general tutored pupils showed greater gains than untutored pupils. Additionally, Burrow found that pupils who were taught by more able tutors showed no greater gain in arithmetic computation than did pupils who were taught by less able tutors.

Tutoring by elementary school pupils. Ackerman (1970) reported findings similar to those discussed above by Burrow. In a project to give personal assistance in arithmetic pupil tutors were described as "valuable" in increasing the arithmetic achievement of low-achieving third grade subjects. Ackerman pointed out that the tutees of low achieving tutors performed as well as tutees of high achieving tutors.

Niedermeyer and Ellis (1971) reported on the results of the Southwest Regional Educational Laboratory Tutorial Program. Fifth and sixth grade students were trained by kindergarten teachers to tutor their pupils in reading by using highly structured practice exercises. These materials were part of the Southwest Regional Laboratory, Communication Skills program. Pupils who were tutored scored significantly higher on the posttests. Modifications were made in the tutoring program when it was found that tutors needed more training in certain skills.

Niedermeyer (1970) reported the separate effects of the training variable on the instructional behavior of student tutors. Behaviors of six trained and six untrained fifth grade tutors were recorded on the "Tutor Observation Scale" as the tutors worked with kindergarten pupils using programmed materials related to a reading program. Niedermeyer reported that trained tutors scored significantly higher than untrained tutors on (1) engaging the pupil in friendly conversation, (2) confirming, (3) praising, (4) giving correct answers, and (5) eliciting correct responses. Niedermeyer stressed the desirability of proper tutor training in these basic instructional principles.

Harrison (1969) also stressed the importance of training with pupil tutors. After identifying certain tutoring techniques those tutors who were trained and those who remained untrained were given the same instructional materials and were allotted the same amount of time. Results from a posttest indicated that the effectiveness of trained student tutors is greater than that of untrained tutors.

Rosner (1970) described the necessary characteristics for a successful cross-grade tutorial reading program. The successful program incorporates characteristics conducive to maximizing the learning appeal such as preplanning, attitudinal emphasis, orientation sessions, varied multisensory approaches, record keeping, and ongoing supervision and evaluation by the reading teacher in charge.

Test results of one of the tutoring cylces which was representative of many others studied by Rosner (1970) over a six year period was described as follows: Thirteen fifth and sixth graders, all remedial students, were matched as tutors with a like number of second and third graders as tutees for a ten week tutorial cycle. All children were pretested and posttested on standardized reading achievement tests. In the beginning all averaged two years or more below their reading grade level. At the end of ten weeks the second and third graders averaged a four month or more reading gain, the fifth and sixth grade tutors, tutoring mornings and receiving remediation afternoons averaged a remarkable one year or more reading gain.

Paoni (1971) described the reciprocal effects of sixth graders tutoring third graders in reading. The third graders were tutored by the older students for thirty minutes per day for three days a week for a four month period. The findings of this study indicated that with the tutees no significant gains were made in vocabulary subtests. The tutor's reading comprehension did not significantly improve. However, positive changes in attitudes toward reading were reported for both tutors and tutees as compared to control groups. Third graders showed significantly greater gains in reading comprehension when tutored by the sixth graders than did control groups. The student tutors were declared to be effective and reciprocal effects on the tutors were observed.

Thomas (1972) compared elementary age tutors with college age tutors on their effectiveness in tutoring second graders. Thomas found that age and intelligence made no difference in the tutor's ability to promote gains in ability of the tutees in reading tasks involving oral reading performance and comprehension growth. However, vocabulary acquision was found to be greater with college age tutors. Thomas concluded that tutors who have not benefitted from the formal education of credentialed teachers can be quite effective.

Tutoring by College Students and Other Adults

A variety of circumstances and ages have been associated with tutoring by adults. The list includes senior citizens, Viet Nam veterans, housewives, parents, and assorted volunteers.

Tutoring by adults. Part of the "Foster Grandparents Project" described by the Office of Economic Opportunity (1967) involved tutoring. Low-income persons over 60 years of age were recruited, trained and employed to serve neglected and deprived children who lacked close personal relationships with adults. Similarly, Keegan and MacLean (1971) described the utilization of older persons recruited from a senior citizen's housing unit in volunteer tutoring with disadvantaged children.

Anderson (1971) described how Viet Nam veterans were successfully used as tutors as a part of the Career Opportunity Program.

Volunteer tutors described as middle-aged, middle-class housewives with varied background were recruited as reading tutors in Cleveland under the Program for Action by Citizens in Education (1968). This Early Reading Assistance Program was a non-profit citizen's organization developed to provide tutorial reading assistance for children in suburban Cleveland Public Schools. A strict scheduling of the tutoring sessions was patterned to provide two hours per week of individualized instruction for each child for a period of 13 weeks. Improved reading achievement, attitudes toward reading, and positive behavior changes as a result of the tutoring were reported.

A volunteer after school reading tutoring program was reported by Schoeller and Pearson (1970). Tutors trained and supervised by reading specialists tutored lower achieving fourth grade pupils for an average of one and one-half hours per week for approximately three months. The mean gains ranged from a high of 9.2 months in letter sounds to a low of 3.6 months in oral reading. In all of the eight selected criterion areas gains were measured in excess of one month's growth for each month of after school tutoring. In the subjective analysis Schoeller and Pearson reported improved pupil attitudes toward themselves, reading, and school in general.

Shaver and Nuhn (1971) described a successful Title III ESEA tutoring project. Women selected on the basis of their reading and writing ability were trained with an emphasis on understanding the lack of positive self concept that accompanies underachievement, diagnosing student deficiencies, and providing specific assistance in an accepting atmosphere in which success could be experienced. Underachieving fourth, seventh and tenth grade students were tutored one hour daily in reading and writing in one-to-one and one-to-three groupings. Results of the project after one year and the retention effects after two years were described. No significant differences were found between pupils tutored individually and in small groups. Both were highly successful across all grade levels. However, tenth grade pupils tutored on a one-to-one basis scored higher than those tutored in one-to-three groups. The significant differences favoring tutored groups in reading and writing were maintained two years later for the seventh and tenth graders but not for the fourth graders. Shaver and Nuhn concluded that tutoring had a positive impact and that tutoring in small groups was as effective as individual tutoring under the conditions of their study.

Parents tutored their own children in a Mobilization for Youth Program entitled "Supplementary Teaching Assistance in Reading" (STAR). The program described by the National School Public Relations Association (1972) was designed to provide parents with tools and techniques to tutor their children in reading at home. Reading aloud to their children was stressed. The predominantly Puerto Rican parents were trained by indigenous non-professionals who were housewives themselves. Results were that children of trained parents scored higher in nine different reading tests than did the control group of matched children who received two hours of remediation per week from professionals. Tannenbaum (1968) declared the success of the STAR program banked heavily on the hypothesis that non-professionals can compensate in devotion and enthusiasm for what they lack in teaching skill.

Rosenshine and Furst (1969) evaluated the effectiveness of tutoring by college juniors enrolled in psychology courses at Temple University. The Juniors tutored middle school students in reading and arithmetic. The researchers compared students who received tutoring with the scores of similar control students. Scores on city-wide Iowa Tests of Basic Skills were used as pretest and posttest scores. There were no significant differences between the eighteen tutored and eighteen non-tutored pupils on the pretests, and nonsignificant differences persisted on the posttests.

One year later a replication of the above study employing improved procedures of randomization and utilization of students from only one elementary school yielded similar null results (Furst, Rosenshine, and Mattleman, 1970).

Both positive and negative results were reported by Glatter (1967) who studied the effect of nine weekly two-hour tutoring sessions upon the arithmetic and word knowledge scores of sixty underachieving fifth and sixth grade pupils. A second, untutored group served as controls. The tutors were sixty college juniors or seniors. Each session consisted of formal, individualized instruction in the basic "three R's," focusing attention upon the pupils' particular weaknesses.

Results of the program were determined by gains in arithmetic computation and word knowledge on the Metropolitan Achievement Tests. The experimental group was superior to the control group on the arithmetic computation subtest, but not on the word knowledge test.

Minimal achievement gains resulted from tutoring as reported by Falik and Wexler (1971), Olsen (1969), and Nichols (1968).

Falik and Wexler (1971) discussed the difficulties which basically untrained adult tutors found in meeting academic needs in a program entitled "Bridging the Gap." The program was hampered by the short duration of tutorial contact and the lack of ongoing assistance for the tutors. These weaknesses resulted in a program limited to building interpersonal relationships. Though this emphasis is not without merit since the tutees needed to improve attitudes associated with schooling, growth in academic achievement was not assured.

Olsen (1969) studied the effects of enrichment tutoring by volunteers with underachieving boys. Self concept, educational achievement and measured intelligence were the dependent variables. Treatment involved second, third, and fourth grade boys being tutored in an empathetic manner by volunteer adult tutors. The boys were identified by their teachers as underachievers and additionally they scored at least two months below grade level on a standardized achievement test. Olsen found no significant differences between tutored and non-tutored groups. However, positive changes were reported by the student's teachers in areas of improved attitudes, grades and reading habits.

Nichols (1968) studied the effects of tutoring on self concept, reading achievement and selected attitudes of disadvantaged intermediate grade children. Tutoring was done by university students. Measurements were made by means of informal questionnaires and the Gates-MacGinitic Reading Tests. No significant difference was found in reading comprehension between the fifty-three intermediate grade students and the control group. However, significant differences were found on the vocabulary subtest, and in three out of twelve attitude factors. Boys excelled over girls on School Related activities. Although minimal achievement growth was found the informal questionnaires revealed parents, teachers, and tutors felt that tutorial sessions were valuable according to Nichols.

Summary

Tutorial studies showed favorable results with great consistancy. Very few studies showed minimal results from tutoring. Particularly successful were students tutoring younger disadvantaged children. The age of persons serving successfully as tutors ranged from senior citizens to elementary school pupils. Beneficial reciprocal effects accruing to the tutors themselves were described. Effective tutoring involved individuals as well as small groups. Training of the tutors was deemed desirable particularly with pupil tutors.

From the literature reviewed it may be concluded that neither lack of formal pedagogical skills, age, nor status of the tutor stood in the way of effective tutoring. It would appear that the academic problems of low achieving children are not so complex that real assistance can only be provided by professional teachers.

THE PARAPROFESSIONAL AND PUPIL PERFORMANCE

What influence have paraprofessionals had on pupil performance? Literature which relates to the use of paraprofessionals in the classroom and the effect of paraprofessional assistance in increasing pupil achievement are discussed under the following headings: (1) the use of paraprofessionals in the classroom, (2) descriptive reports suggestive of general trends in paraprofessional effectiveness, (3) negative results and paraprofessional assistance, and (4) the paraprofessional and pupil performance.

The Use of Paraprofessionals in the Classroom

The preceding section dealt with the positive benefits derived from individual and small group tutoring by other non-professionals. It would appear from the foregoing review of the literature that paraprofessionals should contribute in a similar manner to the academic progress of individual students. However, paraprofessionals do not always function in the role of tutor. If the paraprofessional aide is not used for instructional activities in the classroom, or if there is poor communication or limited interaction between professional teacher and the aide the contribution of the paraprofessional is diminished. As White (1971) pointed out in his suggestions for teaching the disadvantaged:

> The primary motive for hiring aides is to provide assistance in the teacher-learner process. (White, 1971:227).

In his comprehensive handbook and guide for the use of teacher aides, Harrison (1971) underscored the necessity for their proper selection, orientation, and training in order to achieve the purpose of improving the teacher-learning situation. A planned strategy for teacher aide use is essential.

Dauzat (1972) stated that professionals must not squander on nonproductive tasks the potential source of rich opportunities for children which the paraprofessional represents. In an address to the International Reading Association Dauzat stressed the valuable roles which paraprofessionals have to enact in the effective reading program commenting:

> Paraprofessionals in the classroom are justified only to the extent to which educational benefit accrues to the children in that classroom (Dauzat, 1972).

"It is no longer a question of whether we should use paraprofessionals, but how do we best prepare them, utilize them, and fully tap their potential," stated Mauser (1972) in a paper presented to the International Reading Association Convention.

"How do paraprofessionals improve the learning of children?" asked Riessman (1972) long an advocate of paraprofessional use in classrooms with disadvantaged children. Reissman suggested four areas wherein the utilization of paraprofessionals can improve the learning of children. The first three were involved with sharing the instructional and non-teaching tasks between the teacher and aide. The fourth described a move toward a higher level professional role on the part of the teacher.

> The requirement of assigning a child to an aide for reinforcement has demanded a more definitive approach to specifically what the child should be learning. (Riessman, 1972:88).

Mauser (1972) concluded from his review on the paraprofessional that by giving proper training to paraprofessionals more positive results in student reading progress may be achieved. However, much of the research appearing on paraprofessionals is descriptive or subjective in nature. Matheny (1970) described empirical research on the utilization of paraprofessionals in education and the helping professions for the most part as less-than-adequate. Erickson (1971) noted that few tutoring programs have been examined objectively, and their popularity is often based on subjective evaluation.

As explanation for paucity of concrete evidence on the effectiveness of the paraprofessional, it should be noted that there were relatively few programs involving paraprofessionals before 1965 and few summaries in the literature before 1967 (Gartner 1971). One of the earliest surveys was conducted by the American Institute of Research AIR (1968) on behalf of the Office of Education. This AIR survey of compensatory education programs from 1963 to 1968 found only 23 out of 1,000 programs yielded measured educational benefits of cognitive achievement. Ten of these successful programs involved the use of paraprofessionals. Riessman (1972) described this bit of evidence as "deviant case analysis." Admittedly this type of argument holds little water since it was not mentioned how many of the 1,000 programs utilized paraprofessionals which did not yield cognitive achievement benefits.

Stressing the recency of the paraprofessional movement Brickell, Aslanian, Smith, Beery, Barcus, and Scott (1971) stated that paraprofessional programs really only got underway by 1967 in New York City schools. By 1971 these schools were employing 14,000 persons at an annual cost in excess of sixty million dollars. Nearly all of these persons had been hired within the previous four years.

Descriptive Reports Suggestive of General Trends in Paraprofessional Effectiveness

In an essentially descriptive design with an emphasis on process analysis Bowman and Klopf (1968) reported the use of teacher auxiliaries within fifteen demonstration training programs scattered throughout the United States, financed by OEO during 1966-67, and the Bank Street College of Education. The basic hypothesis underlying the study was:

> The utilization of low-income workers as auxiliary personnel in school settings may, with appropriate role-development, training, and institutionalization, have positive outcomes for pupil learning, home-school relationships, teacher competence, and development of auxiliaries as workers and persons. (Bowman and Klopf, 1968:12).

This study concluded that auxiliary personnel are capable of making a positive contribution to the learning-teaching process providing: (1) a floor and ceiling for auxiliary functioning is established; (2) within these limits, role development is stressed in such a way as to consider the needs of each learning situation, the structure within which the auxiliary works, and the personal strengths of the auxiliary; (3) teachers and auxiliaries are trained together both in pre-service and in-service stages; (4) the auxiliary role becomes institutionalized as a new career model; and (5) every staff member is perceived as capable of contributions.

Moreover, Bowman and Klopf suggested three major benefits from the utilization of indigenous personnel as auxiliaries:

> (1) the indigenous auxiliary has a cultural bridge by which he can approach the disadvantaged child in a way that is neither strange nor threatening; and (2) he serves as a social model for disadvantaged children; and (3) he can help the middle-class teacher to better understand the needs and resulting behavior of the disadvantaged child. (Bowman and Klopf 1968:10).

The absence of a control group led Vellutino and Connolly (1971) to view the achievement results of remedial readers in Albany who were assisted with programmed materials by paraprofessionals as descriptive and suggestive of general trends. Reading levels of the inner-city students participating in this study were extremely low to begin with. Scores on standardized tests at the end of a two year period showed most of the children to be approaching grade level in reading. The intervention of paraprofessional service proved successful.

The paraprofessionals employed in this Albany project were originally persons with college training. As the project went on neighborhood mothers with no higher education were used. The latter group proved to be more satisfied with the paraprofessional position and the modest salary than were the college trained assistants. The researchers concluded that the mothers trained to work with programmed materials were a fruitful population for future paraprofessional employment.

Objective evaluation of the 1971-72 instructional aide program in Prince George's County, Maryland (1972) was not made since this expenditure was not budgeted. However subjective the evaluation, persons closely associated with daily operation of the program claimed it to be a success: students benefitted academically, aides contributed to improved classroom instruction, human relations were improved as were students' self-concepts. School administrators commented that more individual and small group attention was given students; reading programs were improved, and student achievement improved and students began to experience success instead of failure and their behavior improved. Many comments relating to the strength of the program indicated greater individualization of instruction was possible. (Tanner and

Tanner, 1969).

The effectiveness of teacher aides in eight Model City Indianapolis Public Schools as perceived by themselves and others was reported by Sciara and Jantz (1972). Findings indicated that these teacher aides were doing an effective job in contributing to the overall learning environment as subjectively perceived by administrators, teachers and teacher's aides.

The primary objective of a New York early childhood compensatory education program involving paraprofessional reported by Hofman, Zaloom, Paone, Hofmann, Rosen, Leibowitz, Edmundson, Joiner, and Roberts (1972) was to reduce the adult-pupil ratio to better meet the needs of each child. It was determined that the program had been successful in that the paraprofessional assistants made possible more efficient, creative, and flexible methods of teaching, improved academic achievement, and social behavior of the children involved. The program additionally established valuable ties between communities, homes and schools served. Reading aims of the program were achieved in kindergarten and the first grade but not in the second grade.

Closer alliance with the community flexibility in classroom structure, more productive manageable children, and more individualization of instruction were also mentioned by Mauser (1972) as benefits accruing to school systems that introduce well-trained teacher aides.

In a recent U.S. Government publication on the results of research on the paraprofessional, Rittenhouse (1972) described appropriate orientation, training, supervision and working conditions necessary for a successful paraprofessional assistance program. Effective functioning in the classroom is possible with aides from different backgrounds, with varying amounts of education and work experience and of different ages. Rittenhouse stressed the necessity for changes in the roles of the school staff members when paraprofessionals are introduced into the school setting. Professional supervision was described as crucial in deciding what duties aides can and should perform.

Rittenhouse summed up an important concept on the use of paraprofessionals in the classroom:

> Involvement in the instructional program is essential if aide talents are to be utilized effectively (Rittenhouse, 1972:9).

Yet, only a few years earlier Snyder (1968) reported that only 24 percent of the teachers surveyed used paraprofessionals in small group instruction. The majority of paraprofessional time was spent in clerical work or assisting with classroom decoration. Results of this study indicated that paraprofessionals can function in a useful role to relieve the regular teacher of many non-teaching duties. Teachers in Snyder's study held a positive view of paraprofessional assistance.

Herman (1967) described how teacher's aides could be of help in the classroom. Yet, as recently as 1967, his suggestions included three times as many non-instructional tasks as instructional functions which were suitable for teacher aides.

It would appear that unless there is a high level of paraprofessional involvement in the instructional program a reduced adult-pupil ratio, resulting in an improved teaching-learning situation that educational benefits would not be anticipated. Bearing out this conclusion are the studies which follow.

Negative Results and Paraprofessional Assistance

Achievement gains were not forthcoming in some classrooms where paraprofessionals were employed.

An analysis of the areas where educational achievement levels were not improved through the assistance of paraprofessionals led Poulos (1971) to report a Detroit program's recommendations.

> All of the paraprofessional aides' day should be devoted to activities entailing instruction in the classroom . . . . School principals should be made more administratively cognizant that the essential role of the teacher aide is the improvement of educational achievement. (Poulos, 1971).

Positive aspects of the Detroit program described by Poulos are reported in the section on pupil performance.

Boyum (1972) compared the pre and post-achievement and interest data of large classes of fifty students taught with the assistance of an aide and regular classes of thirty-two students with no aide. Ten sections of ninth grade science classes at Coon Rapids Junior High in Minnesota during 1969-71 school years were compared. The control group exceeded the experimental group in achievement. It was concluded that large paraprofessionally assisted classes hindered students' achievement. Although such classes saved money and space for the school, it was at the expense of student achievement.

Miller (1970) found no evidence that aides provided more instructional time leading to improved pupil performance. No significant difference was found between two groups of teachers, with and without aides, in clerical activities, routine activities, total group instruction or differentiated instruction. The teachers with aides actually spent more time in clerical activities and total group instruction. The study was designed to compare the utilization of instructional time of first grade teachers with and without full-time teacher aides, to compare the academic performance of these two groups and to examine the relationship between teacher and aide activity.

One teacher aide served six teachers in a study described by Berquist (1968). Two schools had this arrangement and were designated as the experimental group. Two schools of equal number of classrooms having no teacher aides were designated the control group. Achievement as measured by the Iowa Test of Basic Skill and attitudes measured by the author's attitude inventory. Results of the study showed no relationship between achievement and the use of teacher aides when the ratio of one aide to six teachers was used.

Lefkowitz (1973) expressed a negative outcome which could result from the "infiltration" of paraprofessionals into the teaching ranks. The increasing entrance of paraprofessionals into the school without academic preparation or adequate training proclaims to the world, worried Lefkowitz, that "anyone can teach." The writer warned that the teaching profession could regress to the days of the normal schools when college graduation for elementary teachers was not always necessary.

Lefkowitz, additionally, expressed concern over the school district training programs for paraprofessionals.He suggested that most of these programs were inadequate to train paraprofessionals or to develop a team operation between the teacher and the paraprofessional. In light of the fact that a number of researchers, Harrison (1971), Riessman (1972), Mauser (1972), Bowman and Klopf (1968), Vellutino and Connolly (1971), and Rittenhouse (1972) stressed the need for appropriate training and supervision of the paraprofessional, Lefkowitz's warning must be heard. For if school districts do not sustain adequate training programs or careful supervision of paraprofessional, their use could well be detrimental to our educational system, implied these authors.

Programs which appeared to provide the optimum conditions for the improvement of the teaching-learning situation through appropriate utilization of the paraprofessional follow.

The Paraprofessional and Pupil Performance

What influence have paraprofessionals had on pupil performance? Studies which have been credited with improving the academic achievement of disadvantaged youngsters and which have involved the use of paraprofessionals in the classroom are reviewed in this section.

Between 1966 and 1968 the Minneapolis Public Schools carefully studied the paraprofessional contribution to pupil performance. As reported by Bennett and Falk (1970) nine kindergarten classes, three with no paraprofessional aide; three with one aide and three with five aides were studied. In January, 1968 the Metropolitan Reading Readiness Test was administered as a pretest. Posttesting on the same instrument took place in May of that year. The classrooms each had about thirty pupils half of whom were Black. Results showed that classes with one aide made a 50 percent greater gain than the classes with no aide. Those with five aides did better than those with no aide but not as well as those with only one aide.

The middle schools of Hammond, Indiana, used paraprofessionals in a corrective reading program in grades six through eight. (City of Hammond Schools, 1970). In all three grades studied reading gains for the experimental groups which were those with paraprofessional tutors exceeded the gains for the control groups, those without tutors.

The project report stated that on the basis of their findings paraprofessionals can be well used in providing remedial reading instruction. The Hammond model was thereafter adopted in some fifty projects in twelve Middle-West states.

Ireland (1969) reported that in Atlanta, Georgia in a Title I ESEA program 108 paraprofessionals worked in forty-seven poverty neighborhood schools. Upon evaluation of the program it was found that reading gains of third grade pupils were greatest in those classes that used paraprofessionals as compared with both other Title I and non Title I schools that did not use them.

The East Charles Mix Independent School District (1971) Title III reading program provided lay tutors for 167 children with reading levels considerably below grade level. Consultants were used to train the paraprofessionals. Evaluation after one year indicated test scores on the Durrell Listening - Reading Test showed the positive effect of the program. Iowa Test of Basic Skills scores indicated students were making as much or more progress in the program than before the program.

The teacher aide component of a Detroit program was described by Poulos (1971). The program was designed to improve the levels of educational achievement through the assistance of paraprofessional aides residing in the community. The program evaluators sought to determine whether teacher aide services had any effect on pupil achievement as determined by standardized achievement test scores of third, fourth, and fifth grade pupils. Reading and arithmetic subtests of the Stanford Achievement Test were compared with comparable pupils who experienced little or no teacher aide service. The findings indicated that fourth grade pupils benefitted considerably from exposure to saturated teacher aide service but this was not the case with the third and fifth grade pupils.

Because of similarities to the present study and the extensive reporting on the project the following study was most carefully examined. Brickell and others (1971) addressed themselves to this important question:

> What connection, if any, exists between measured student achievement in cognitive and affective areas and the presence or absence of paraprofessional service?

In introducing the study Brickell and others stressed that previous evaluation studies of educational programs involving paraprofessionals had left unanswered this most important question. One explanation given by the authors was the recency of the paraprofessional movement.

Sixty-three experimental and thirty-five control classrooms were selected at random for the study which included 2,821 third grade students in New York city schools. The experimental classrooms received paraprofessional service; the controls did not. Paraprofessional service was described as the paraprofessional working alongside teachers teaching and tutoring small group and individual students. The Metropolitan Reading and Arithmetic Tests were used to measure achievement in a pretest and posttest research design. Improvement in achievement was defined as having moved upward in percentile rank. That is,a child's improvement score was his posttest percentile minus his pretest percentile. Findings were as follows: students in classrooms with paraprofessionals improved more in arithmetic and reading than students in classes without paraprofessionals. Black children in particular improved more in classrooms where paraprofessionals were present. Boys improved as well as girls; there were no sex differences associated achievement. Changes in attitudes toward school were uncertain.

Noted by Brickell and others (1971) were the characteristics of the paraprofessional which proved most important of pupil improvement was her ability to relate well with other people, stable, interested, knowledgeable, and intelligent in that order. Personality characteristics mattered more than whether she was young or old, Black or White, rich or poor, modestly educated or well educated.

A study of paraprofessional aides in grades one through four in the Portland, Oregon schools was conducted by Conant (1971) from the University of Oregon. This study on the use of paraprofessionals in, minority enrollment schools was done as a cost-effectiveness study. The central considerations were the teaching divisions of labor within an elementary classroom, the cost analysis of instruction in single teacher and teacher plus aide classrooms and the effect upon pupil reading scores of the teacher plus aide classrooms.

Conant (1971) found that with regard to the division of labor, teachers in Oregon schools who worked with aides instructed for greater lengths of time than in single teacher classrooms. In fact, the aides spent more time in instructing in remedial language arts than the teachers themselves. With regard to the cost analysis of instruction, it was found that the average total cost of instruction in teacher plus aide classroom was $8.80, while the average total cost in single-teacher classroom was $16.00. With respect to the effect of teacher-aide classrooms on student reading scores, it was found that paraprofessional instruction in remedial reading was a significant factor in effecting the upward shift in achievement levels of disadvantaged children. Conant concluded that the increased money expenditure on paraprofessional aides did increase the reading levels of disadvantaged children. Paraprofessionals did contribute valuable services to educational institutions at a relatively low cost.

Kunkel (1968) found an increased amount of time available for student-teacher dialogue in classes using teacher aides. Measuring change in communication patterns of teachers using aides were compared to those not using aides. Kunkel found teachers using aides allowed more student talk and response to questions. The Flanders Interaction Analysis technique was used to measure the communication patterns. This extensive study involved fifty-nine teachers in the experimental group and sixty-nine in the control group.

Programmed materials combined with trained paraprofessionals in a tutorial setting have proved successful in promoting pupil progress in a number of recent studies.

The programmed tutoring technique developed by Ellson at Indiana University has been successfully duplicated in a number of programs. Ellson (1970) reported on the development of the programmed tutoring technique. Trained tutors (paraprofessionals) were taught to follow tightly prescribed detailed instructions. Programmed lessons in reading were formally presented to lower achieving primary children. The American Institute of Research (1971) published information on Ellson's program using paraprofessionals to individually tutor disadvantaged children in reading. The Programmed Tutorial Reading Project in Indianapolis School District involved over 1,200 first and second graders who were tutored in reading by paraprofessionals for 15 minutes a day as a supplement to classroom teaching. Tutored pupils made large gains over matched control groups in reading achievement test scores. Additionally, the program reduced the proportion of non-readers in the project schools.

Hartwig (1972) studied the effects of programmed tutoring on the reading achievement of lower achieving second grade children from low income areas in Sacramento County. Pupils in the experimental group received fifteen minutes of programmed tutoring daily for seven months as a supplement to their regular classroom reading instruction. The paraprofessionals providing the tutoring were described as: indigenous to the school community, holding high school diplomas, and having poverty status. The tutors were trained in the use of programmed tutoring techniques by the school district with the assistance of personnel from Indiana University. Results of Hartwig's study indicated that tutored pupils scored significantly higher than non-tutored pupils in criterion referenced reading tests but not on the normative referenced tests.

McCleary (1971) reported the results of a tutorial reading project using programmed materials with first grade children who were lacking readiness for reading. Following the tutoring techniques as developed by Ellson at Indiana University, first graders in Lenoir County schools in North Carolina were tutored by trained paraprofessionals. The experimental group were provided systematic tutoring as a supplement to their regular classroom teaching assignment. The control group received only regular classroom assignments. Results at the end of two years found achievement differences measured by the Ginn Achievement Test between the control and tutored groups to be quite large and statistically significant. An additional index of program effectiveness was the classroom teacher's evaluation of the child's abilities as she passed the child on to the next grade or retained him. The proportion of retention was 55 percent lower for the tutored group. The researcher described programmed tutoring as "preventive medicine" against reading failure.

Davis and Morrow (1970) reported the outcomes of an ESEA Title I program using Sullivan Programmed Mathematics materials. Paraprofessional assistance was provided fourth, fifth and sixth grade underachieving students who were one or more years below grade level. Teacher aides trained in the use of these programmed materials met with their pupils on a daily basis throughout the school year. Fourth grade results were more than hoped for. Although fifth and sixth grade success was somewhat less, statistical tests indicated all grade levels made significant growth. It was concluded that

> Provided the necessary individual attention and the opportunity to work at his own level of achievement, the deprived child can show significant progress. (Davis and Morrow, 1970).

Summary

The use of the paraprofessional was found to be part of a growing movement in education. Descriptive reports suggestive of general trends in paraprofessional effectiveness indicated that proper selection, training, supervision were essential in order to improve the teaching-learning situation. Aides from varying backgrounds have functioned effectively in the classroom. Involvement in the instructional program was deemed essential by more than one writer.

Negative results from paraprofessional assistance derived from situations where the adult-pupil ratio was not improved, the paraprofessional served a large number of teachers, or paraprofessionals were not always used for the purpose of improving educational achievements in the classroom. Inadequate training programs for paraprofessionals or lack of professional guidance were mentioned as detrimental to educational programs.

Studies of the paraprofessional's influence on pupil performance showed positive academic growth in a number of cases. A variety of low achieving children benefitted from paraprofessional assistance. Improved performance was reported with kindergarten children in a readiness program, third grade pupils in reading, fourth grade pupils in reading and arithmetic, third grade pupils in reading and arithmetic, and grades one through four in remedial language arts. Communication patterns were enhanced through paraprofessional assistance in another project.

A study involving cost effectiveness showed that the cost of successful instruction in a teacher aide classroom was less than in single teacher classrooms.

Programmed materials were incorporated in a number of programs utilizing paraprofessional tutors trained in their use. Tutored primary children made greater gains on criterion referenced tests than did similar children who did not receive the programmed tutoring.

Investigations into the effectiveness of paraprofessional assistance in increasing pupil achievement indicate that positive results have taken place in a large number of instances. Writers have quite universally agreed upon the need for appropriate training, supervision and utilization of the paraprofessional by the professionals involved. Disadvantaged children have benefitted educationally from guided paraprofessional assistance as shown by a review of pertinent literature.

SUMMARY

The five sections included in the second chapter of this study, individually summarized in the preceeding pages have been outlined as follows: (1) Migrant children were described as having multiple handicaps which have made it difficult for them to succeed in the school world. (2) Migrant education programs in California and other states were varied in their approaches. Most programs were intent upon improving communication skills. Although paraprofessionals were frequently employed in migrant programs this fact was not made much of an issue. (3) Achievement related to the sex of the student appeared to slightly favor girls. (4) Other non-professionals used as tutors were quite consistently reported as being successful. The tutorial setting supervised by professionals, taking place at regular intervals appeared to be worthwhile for disadvantaged children. The age of persons serving successfully as tutors ranged from senior citizens to elementary school pupils. Training of tutors was deemed desirable. (5) The paraprofessional and pupil performance studies indicated positive academic growth in a majority of cases. Negative results from paraprofessional assistance derived from situations where the adult-pupil ratio was not improved, many teachers were served by one paraprofessional, or paraprofessionals were not appropriately used in the instructional program. Inadequate training programs or lack of professional guidance were deemed detrimental to educational programs. In most instances guided paraprofessional assistance in the instructional program resulted in positive achievement gains for disadvantaged children.

Chapter 3 presents the design and procedures of the study.

Chapter 3

THE DESIGN AND PROCEDURES OF THE STUDY

The design and procedures of the study to investigate the effect of paraprofessional assistance on the academic achievement of lower achieving immigrant children are presented in the following sections: (1) the setting, (2) the subjects, (3) the treatment groups, (4) the instruments, (5) the procedures, (6) the research design, (7) the hypotheses, and (8) the statistical analyses.

THE SETTING

The study took place in a rural agricultural area of the San Joaquin Valley in Central California during the 1971-72 school year. Data was gathered from thirty-four school sites in rural Fresno County where migrant farm workers' children were enrolled.

Fresno County is California's number one agricultural county with the gross value of its agricultural industry exceeding five hundred million dollars according to the Fresno County Department of Agriculture Crop Report (1972). Leading crops having high seasonal labor requirements include: cantaloupes, tomatoes, lettuce, sugar beets, cotton, assorted stone fruits, citrus, and grapes. Large acreage of raisin as well as fresh and wine varieties of grapes require a great deal of hand labor. Large influxes of migratory workers and their families arrive in Fresno County during certain months of the year. Local labor camps open during that part of the year when farmers have the greatest need for farm workers.

Schools in Fresno County contend with the constant coming and going of children of these migratory farm workers. Sudden increases in school population are likely to occur for a period of a few months or only a few weeks. School facilities become suddenly overcrowded. Shortages of textbooks, desks and school supplies often result. The long term residents in the school and community sometimes feel a resentment toward these newcomers.

Recently, in the spring of the year there have appeared increasing numbers of farm worker's children who speak no English. Very few teachers speak Spanish nor are there available many materials from which these students can learn in our present school system. These children add to the burdens of the small rural school.

THE SUBJECTS

The subjects involved in this investigation were: (1) the paraprofessionals who provided assistance in the classrooms and (2) the migrant children who were the recipients of this aid.

The Paraprofessionals

Following the description of the paraprofessionals involved in this study a section on the professionals who trained and supervised them is presented, a brief account of the preparation and training of the paraprofessional is given.

A description of the paraprofessionals. All the paraprofessionals, numbering thirty-five, were female except one. The majority were high school graduates, a few of them had a year or two of community college courses. Many were married with children attending the school in which they worked. Most of the paraprofessionals were Spanish speaking as this was a priority need. Wages varied from school district to school district but all were fairly close to the minimum wage of less than two dollars per hour.

The professionals concerned. School administrators indirectly influenced the migrant children's educational experiences. His educational philosophy affected the assignment of paraprofessionals to one grade level or another, one classroom or another. His attitudes toward migrant children's need for equal educational opportunity had an impact on their educational experience. But the person having the most control over the education of migrant students was the classroom teacher.

The classroom teacher set the stage, provided the curriculum and the atmosphere for learning. The teacher's understanding of the Mexican-American child's cultural and linguistic differences, his ability to teach the disadvantaged child, his resourcefulness in obtaining appropriate curriculum materials, his philosophy of education all affected the migrant child's educational experience.

Classroom teachers were in the position of accepting or rejecting the assistance of the resource teacher. In ideal situations the classroom teacher and resource teacher planned together for the improvement of the migrant child's achievement. For many reasons this ideal situation was not always operative.

The classroom teacher made the decisions as to which migrant children were to receive the paraprofessional assistance and in which subject. Classroom priorities influenced this decision. Where there were a large number of migrant students in a classroom choices had to be made as to which students had the greatest need. Time was divided among these students. There were, unfortunately, some cases where paraprofessionals were used for housekeeping or clerical duties thus reducing the instructional assistance received by migrant children. When this was detected it was remedied. In some instances the paraprofessional was moved to another classroom. In the end there remained some migrant children who received little or no paraprofessional assistance.

The paraprofessional was under the direct supervision of the classroom teacher but given training and guidance by the resource teacher.

The resource teachers' responsibilities were described in the Region IV Educational Component Narrative:

> Resource teachers will be employed by the Regional Migrant Education office to enhance teachers' understandings of the language and mathematics problems of migrant children, to develop methods and choose materials suited to diagnostic and prescriptive teaching of migrant children, and to develop a cooperative working relationship beneficial to the academic welfare of these children. (Fresno County Department of Education, 1971:7).

Ten resource teachers were involved in this study. Some of their responsibilities ranged from grades K-12 others were K-8. The intermediate grades received only a portion of the resource teachers' time.

The preservice and inservice training. Orientation instruction in techniques of assisting migrant children made up the preservice training of the paraprofessionals. Pre-reading skills, language development, reading and mathematics were subjects covered in the paraprofessional training.

Simple arithmetic and reading games and skill reinforcement activities were taught. Paraprofessionals were given an opportunity to cut and assemble these activities into a kit for use with migrant students as needed. Throughout the year additional learning games and skill reinforcement activities were provided.

The paraprofessionals were trained in administering an informal reading inventory to assess migrant students' reading levels. Techniques of word recognition and word learning were taught. Reinforcement of these skills and understandings were continued during inservice sessions throughout the year.

The paraprofessionals were well equipped to give individual and small group assistance to migrant children. The title of tutor was applied to these paraprofessionals to differentiate them from classroom aides whose traditional function had been to assist teachers in housekeeping, clerical and playground duties. Resource teachers kept a constant vigil to assure that paraprofessionals gave tutorial assistance to migrant students.

The Migrant Children

Lower achieving, intermediate grade migrant children were the subjects who received the paraprofessional assistance and whose achievement growth was measured in order to determine the effect of the aid which they were given.

Lower achieving students.

This study was limited to lower achieving students following the belief that higher achieving students were apt to continue to make good progress in school whether or not special assistance was provided. Lower achieving students were selected by means of pretest grade equivalent scores on the Comprehensive Tests of Basic Skills. Grade equivalent scores were provided by the Regional Data Processing Center data printout. Lower achieving students were defined as those whose pretest grade equivalent scores fell below 4.8 for the fifth grade and 5.8 for the sixth grade. Table 1 presents a summary of pretest data describing the range in raw scores, grade equivalent scores and median scores of these lower achieving migrant students.

Table 1

Summary of Pretest Descriptive Data
Raw Scores and Grade Equivalent (GE) Scores
from
Comprehensive Tests of Basic Skills

Subject	Grade Level	Lowest Raw Score GE Score	Highest Raw Score GE Score	Median Raw Score GE Score
Reading	5	13 1.3	50 4.8	30 3.4
	6	11 1.0	61 5.8	36 3.8
Arithmetic	5	03 1.0	59 4.8	39 3.7
	6	16 2.1	71 5.6	52 4.5

Intermediate grade students. Both fifth and sixth grade migrant children were chosen for this study primarily in anticipation of the large number who would leave before the end of the year. As Table 2 reveals 80 students or one fourth of the original 311 identified migrant children did leave. Using students from both grade levels guaranteed a sufficient number for group comparisons. Secondly, both fifth and sixth grades were chosen because these were the only two elementary grade levels where the identical achievement test was given to both grade levels.

The intermediate grade migrant students in this study range in age from approximately ten to fourteen years of age. It is not unusual to find migrant youngsters as old as 14 in the sixth grade. Being over age in grade is common to those students who miss an inordinate amount of school.

Table 2 presents a summary of descriptive data showing the size of the original groups and the size of the groups remaining after migrancy took its toll.

Table 2

Summary of Descriptive Data
Group Sizes

						Treatment Groups		
Grade	Sex	N_1	N_2	N_3	N_4	1	2	3
5	G	79	13	13	53	18	13	22
	B	95	30	23	40	13	18	9
6	G	69	23	14	33	5	3	25
	B	69	14	15	41	9	13	19
Totals		312	80	65	167	45	47	74

Key: N_1 = Original group
N_2 = Group which left due to migrancy
N_3 = Group of high achievers eliminated from the study
N_4 = Group remaining for investigation
Treatment Groups
(1) Received assistance in arithmetic and reading
(2) Received assistance in reading
(3) Received no assistance in arithmetic or reading

THE TREATMENT GROUPS

Varying conditions which prevailed at the 34 school sites resulted in differing amounts of assistance given to migrant children. Resource teachers who visited these schools on a regular basis completed a checklist which indicated the amount of assistance received by each migrant child. From information supplied by the "Checklist of Assistance Received," which may be found in the appendix, the identified migrant children were differentiated into the following groups:

Group 1. Migrant students who were assisted approximately fifteen minutes per day for at least four days per week in reading and an equivalent amount of time in arithmetic.

Group 2. Migrant students who were assisted approximately fifteen minutes per day for at least four days per week in reading.

Group 3. Migrant students who were not assisted in arithmetic or reading.

Table 2 presented a summary of numerical data describing these groups.

Variation in the amount of assistance given to migrant children resulted from a number of conditions: the educational philosophy of the school administrator who employed and scheduled the paraprofessional, the limited and uncertain funding, and the fluctuating enrollment of migrant children. The amount of paraprofessional assistance received was dependent upon one or more of the following circumstances:

1. The number of paraprofessionals employed by the school district and the length of their work day.
2. The number of migrant children enrolled in the school and

the classrooms to which they were assigned.

3. The priorities set by the school administrator who assigned the paraprofessional to a grade level, certain teachers, and class periods.
4. The priorities set by the classroom teacher which determined: the students needing the most help, the subjects to which help was given, and the size of the group with which the paraprofessional worked.

Described under the Region IV, Migrant Education Program were three groups of migrant children which must not be confused with the treatment groups of this investigation. These were described as follows:

> Group I. This group is identified as "One Year Migrants." They have the most pressing needs for a comprehensive program of instruction, health, and supportive services.
>
> Group II. This group is identified as "One-Year Migrants" but whose classroom performance does not indicate a need for supplementary educational activities, or who may be eligible for supplementary educational activities, but cannot be accommodated due to funding limitations.
>
> Group III. This group includes students who have been previously identified as Group I or Group II Migrants . . . but who have been in one school district for more than one year. (Fresno County Department of Education: 1971).

From Groups I and II described above the subjects of this investigation were taken. Group III migrants described above were not included in this study.

THE INSTRUMENTS

To realize the purpose of this study data was gathered by means of a "Checklist of Assistance Received" and the standardized achievement test The Comprehensive Tests of Basic Skills (CTBS), Form Q, Level 2.

The Checklist of Assistance Received

In order to determine precisely how much assistance each migrant student received ten resource teachers were provided with a checklist for each school site listing the names of all identified intermediate grade migrant students who had been pretested on the CTBS. The resource teachers were instructed to check the amount of arithmetic and reading assistance received by each migrant student. The "Checklists of Assistance Received" were verified through telephone calls to paraprofessionals, classroom teachers, and/or school administrators and followed by final conferences with the resource teachers. From the checklists, a copy of which appears in the Appendix, it was possible for the researcher to differentiate the students into the three treatment groups.

In addition to this checklist the paraprofessionals weekly turned into the Migrant Education Office a "Tutor Performance Record" which was a record of the amount of time spent with each migrant child. The subject areas of reading, mathematics or language development were recorded as well. A copy of the "Tutor Performance Record" is included in the Appendix.

The Comprehensive Tests of Basic Skills (CTBS)

This test was the California State mandated achievement test administered yearly to all sixth grade public school pupils in California. CTBS Level 2, Form Q is designed for students in grades five and six and was selected by the administrators of Migrant Education Program to assess the academic progress of fifth grade pupils as well as sixth.

Description of the Test. The test authors described the CTBS as an instrument designed;

> To measure the extent to which individual students have developed the capabilities and learned the skills which are: (1) prerequisite to the study of specific academic disciplines, and (2) requisite for functioning in a society based on daily use of language and number. (CTB/McGraw Hill, 1969).

The CTBS measures basic skills designed for and standardized on a wide variety of students. Multiple choice test items are used. The student is to select the correct answer from four or five options. The reading tests have two subparts - vocabulary and comprehension. The scores on these subtests are combined to give a total reading score.

There are three arithmetic tests: computation, concepts, and applications. Number problems dealing with the fundamental operations of addition, subtraction, multiplication, and division make up the computation sections. The concepts and applications subtests are composed of verbal problems. In the former, the student is to recognize or use an appropriate numerical or geometric concept. The latter test involves the ability to comprehend an arithmetic problem, select the appropriate method, and solve it. Price (1972:514) has criticized these CTBS concepts and applications tests describing them as "linguistic hurdles" rather than mathematics problems.

Norms. To obtain norms for the test scores the test developers drew a representative national sample of students in public schools. Random samples were drawn of school districts, stratified according to enrollment, geographic region, and socio-economic index. This became the basic normative sample. Norms were not developed for disadvantaged or minority groups as the publishers felt such groups would be proportionally represented in the basic normative sample (Brown, 1972:23).

This fact should be taken into account when judging the generally low scores of a culturally different minority group.

A study of norms relating to the CTBS Level 2 used in this study revealed that a given raw score in reading comprehension for a fifth grade student yields a higher percentile than the same score for a sixth grade student. Ahmann (1972:20) concluded that considering the amount of instruction which takes place in the school year the downward shift in relative performance associated with a given raw score is logical and adds to confidence in the test.

Item selection and content validity. The authors believed that they wrote items which measured "broad concepts and abstractions" rather than specific knowledge which might be dependent upon particular classroom experiences. Brown (1972:21) suggested that one could argue this point but that the CTBS probably contains about as many of these kinds of items as do competing batteries. In his review of the CTBS Ahmann (1972:20) was enthusiastic about the content validity:

> An almost hidden strength supporting the degree of content validity of the CTBS is that classroom teachers, supported by curriculum specialists, were used to write the original test items.

In an analysis of the content validity of selected commercially produced mathematics tests the California Association for Supervision and Curriculum Development (CASCD, 1969) found the CTBS measured seven out of eleven major topics or strands which were put forth in the 1968 "Strands" report by the Statewide Mathematics Advisory Board. The coverage ratio was found to be $\frac{44}{220}$ or 44 skills measured as compared to a possible 220 for the given grade level. In a comparison of ten major achievement tests the CTBS ranked seventh on adjusted coverage, seventh in reduncancy and tenth in efficiency according to the definitions of these terms as put forth by the CASCD.

Brown (1972:21) contended that an obvious weakness of the CTBS was the lack of validity data. Little empirical relationships with external measures, grades, teachers' ratings or other achievement tests have been reported. Although the conscientious construction procedures and certain interal measures can be used to support the content validity of the CTBS, more validity data is needed suggested Brown.

A conclusion. Despite its limitations and imperfections the CTBS has established itself as a valuable tool to measure academic achievement. Ebel (1969) noted that educational achievements are measured to help give purpose and direction to educational efforts and to report the degree of success in learning. His conclusions were in keeping with those of the researcher:

> Pending availability of some superior alternative (which will probably simply consist of better tests, more wisely used) present tests will continue to serve the general good of education (Ebel, 1969:780).

THE PROCEDURES

In the fall of 1971 migrant children enrolled in rural elementary schools in Fresno County were carefully identified and the migrancy of thei. families verified through home visits by Migrant Education Program community aides.

A testing team employed by the Fresno County Department of Education administered the Comprehensive Tests of Basic Skills (CTBS) Form Q Level 2 to intermediate grade migrant children. From the regional Data Processing Center of the Fresno County Department Of Education printouts of pertinent data were obtained by this investigator. This data printed on separate sheets for each student according to school of attendance, included the following information: student name, school site, school district, pretest raw scores and grade equivalent scores for each of the CTBS subtests selected for evaluation purposes by the program evaluators.

The investigator listed the names of each migrant student according to grade and school site on the "Checklist of Assistance Received," to be found in the Appendix, and presented these checklists to the ten resource teachers who regularly visited these schools. The resource teachers kept track of the amount and kind of paraprofessional assistance received by each migrant student. As a further check on the amount and kind of assistance received the investigator consulted the "Tutor Performance Records," to be found in the Appendix. The paraprofessionals filled out this form weekly thereby recording the amount of time spent with each migrant child. These records were filed by the office staff of the Migrant Education Program. Additionally, paraprofessionals were personally contacted by telephone at the end of the school year by this investigator. These telephone conversations were used as an added verification of the quality and quantity of assistance received by each migrant child. Further conversations were held with resource teachers in cases where there were differences in the assessments between the paraprofessional and resource teacher.

During the school year migrant children were given assistance in various school subjects by the paraprofessionals. Due to varying circumstances at the 34 school sites some intermediate grade migrant children did not receive paraprofessional assistance. The reader may refer to the section on treatment groups for an explanation. Instructional aid was usually administered in small groups but sometimes individual tutoring sessions occurred. There was variation in the amount of time given in tutoring migrant children. The range was from fifteen minutes to fifty minutes per subject.

Paraprofessionals giving aid to migrant children were supervised by professional teachers. They were trained during preservice and inservice group sessions to use learning games, activities and techniques for assisting migrant children in the classroom. Resource teachers instructed and guided the paraprofessional and acted as a resource person to the classroom teachers of migrant children.

In May the original testing team administered the Comprehensive Tests of Basic Skills posttests to those students who had been present for the pretest. The investigator obtained a printout of these test scores from the Regional Data Processing Center. The printouts included: an alphabetical listing of students' names, school districts, school sites, pretest and posttest reading, and arithmetic raw scores and grade equivalent scores. (Language subtest scores were also included but were not a part of this investigation.) This information along with data from the "Checklist of Assistance Received" were used to realize the purposes of this study.

THE RESEARCH DESIGN

An adaptation of the experimental non-randomized control-group pretest-posttest Design 5 as described by Van Dalen (1966:275) was selected as the paradigm for this study. The three treatment groups comprised the experimental groups and control or comparison group using a broad interpretation of these terms. Students were not assigned to any of these groups nor were they differentially or randomly selected. Differing circumstances at the thirty-four school sites resulted in variations on the amount and kinds of paraprofessional assistance received by these migrant children. "The Checklist of Assistance Received" prepared by resource teachers revealed the amounts of assistance received and thereby determined into which group the student fell. The experimental groups were Treatment Groups 1 and 2, who received assistance in arithmetic and/or reading. Treatment Group 3 constituted a control or comparison group since this group of children received no paraprofessional assistance in arithmetic or reading.

In Design 5 as described by Van Dalen (1966:276) both the experimental groups and the control groups receive pretesting. The experimental group receives the experimental treatment, the control or comparison group receives none. Both groups receive posttesting.

The variables. In the present study the treatment or assistance received by the migrant children constituted the independent variable. Assigned variables were the students' sex, grade level, and initial achievement level as determined by their pretest quartiles. Controlled variables were the carefully identified migrant children and the selection of only lower achieving students. The dependent variables were the achievement gains as determined by the pretest posttest scores on the Comprehensive Tests of Basic Skills. The effect of the independent variable and influence of the assigned variables upon the dependent variables was investigated.

Sources of internal and external validity. When considering sources of internal validity of this design the following circumstances served to add control to the study: The contemporary history, measuring instruments, maturation,and pretesting were experienced by all groups; hence, the effect of these variables was equalized and cannot be mistaken in the effect of the treatment.

Experimental mortality played a role in this study as might be expected with children of migratory workers. Table 2 indicated the number of students who left due to migrancy. It was not ascertained the number who left from each treatment group since a line was drawn through the migrant child's name when he left and no record was maintained after this. A large number of migrant children were included in the investigation in an attempt to compensate for the anticipated mortality.

Statistical regression as a source of internal invalidity was for the most part avoided. Groups were not selected on the basis of pretest scores other than that the entire study was limited to lower achieving students. The treatment groups equally experienced the possibility of regression. Statistical regression, however, remained uncontrolled when the relationship between initial achievement level and achievement gains were concerned. This was expected because of the involvement of extreme scores.

When considering the external validity of this design the following circumstances served to add control to the study: Schools and students chosen in this investigation were not selected from among volunteers. All school districts which entered into a service agreement with the Migrant Education Program were included in the study. Since this service agreement guaranteed federal funds most school districts in Fresno County which enrolled migrant children were included. All fifth and sixth grade identified migrant students enrolled at these 34 school sites in the fall of 1971 were included in the pretest. Post-tests in the Spring of 1972 were administered to those students still enrolled at the end of the school year. Students were accustomed to seeing paraprofessionals in the schools. Students had no awareness that an investigation was taking place. These circumstances served to control reactive effects and as well as selection bias which might threaten the external validity of the study.

By design the investigation was limited to lower achieving carefully identified migrant children. The selection of subjects from lower achieving migrant children does not present a problem in generalizing the results of the study.

The design for this investigation provided adequate controls for internal and external validity. Therefore, the findings of the study should be generalizable to other migrant children as well as similarly disadvantaged children. Generalizability extends to other paraprofessionals indigenous to the school community, given similar training and supervision.

THE HYPOTHESES

Research hypotheses stated in Chapter 1 have been restated in the null form for the purposes of statistical testing.

Hypothesis 1

There are no differences among the three groups of fifth or sixth grade migrant children in achievement as determined by the Comprehensive Tests of Basic Skills gain scores in (a) arithmetic and

(b) reading.

Hypothesis 2

There are no differences between girls and boys in achievement as determined by the Comprehensive Tests of Basic Skills gain scores in (a) arithmetic and (b) reading.

Hypothesis 3

There are no differences between the fifth and sixth grade migrant children in achievement as determined by the Comprehensive Tests of Basic Skills gain scores in (a) arithmetic and (b) reading.

Hypothesis 4

There is no relationship between the initial achievement level as determined by the Comprehensive Tests of Basic Skills pretest scores and the achievement rate as determined by the Comprehensive Tests of Basic Skills gain scores in (a) arithmetic and (b) reading for either the fifth or sixth grade.

THE STATISTICAL ANALYSES

Data were collected from the "Checklist of Assistance Received" and the Comprehensive Tests of Basic Skills pretest and posttest. From these instruments the collected data were punched on tabulation cards. Table 20 which appears in the Appendix presents the data in the following sequence: student number, grade level, sex, treatment group, reading pretest raw score, reading posttest raw score, arithmetic pretest raw score, arithmetic posttest raw score, and the pretest quartile.

The facilities of the University of the Pacific Laboratory of

Educational Research and the Computer Center were used to carry out the data processing and to provide a printout of the results of the statistical analyses.

Comparisons of the achievement gains made by the treatment groups and the influence of grade level and sex of the student were examined. Analysis of variance was used to test for significant differences among the means of these groups.

The .05 level of significance was chosen for rejection of the null hypotheses.

In order to determine the strength and direction of the relationship between the initial achievement levels and the achievement gains, correlation procedures were used. The statistical significance of these relationships was determined.

The findings of these statistical tests are presented in Chapter 4.

SUMMARY

An outline of the design and procedures presented in Chapter 3 follows: (1) The setting was rural Fresno County in an agricultural area where many migrant farm workers are employed. (2) The subjects were the carefully identified lower achieving fifth and sixth grade migrant children and the indigenous paraprofessionals who gave them assistance. (3) The treatment groups resulted from varying conditions present at the thirty-four school sites which made for differences in the amount and kind of assistance received by migrant children. Group 1 received assistance in arithmetic and reading, group 2 in reading only and group 3 no assistance in arithmetic or reading. (4) The instruments necessary for providing data were (a) the "Checklist of

Assistance Received," and (b) the Comprehensive Tests of Basic Skills. (5) The procedures described: data gathering from the instruments, paraprofessional assistance to migrant children, and explanations for the approaches and data used. (6) The research design used was an experimental nonrandomized control-group pretest-posttest design. (7) The hypotheses were presented in the null form for statistical testing, and (8) The statistical analyses included two-way analyses of variance and correlation procedures. The .05 level of significance was chosen for rejection of the null hypotheses. Chapter 4 presents the findings of these tests.

Chapter 4

RESULTS OF THE STUDY

This chapter presents the findings of the study which investigated the effect of paraprofessional assistance on the academic progress of lower achieving intermediate grade migrant children. The treatment and interpretation of the data obtained are presented in the following sections: (1) introduction, (2) achievement gains, the treatment groups and the sex of the subjects, (3) achievement gains and the grade levels, (4) achievement gains and the initial achievement levels, and (5) a summary of the interpretations of the data.

INTRODUCTION

In the sections which follow data were collected, tabled, analyzed and interpreted in an effort to determine:

1. The effect of paraprofessional assistance in three treatment groups: (1) arithmetic and reading and (2) reading only as contrasted with (3) no paraprofessional assistance in arithmetic or readings on the improvement of academic achievement.
2. The influence of the sex of the student on the amount of gain in achievement.
3. The possible differences between the two grade levels in the amount of achievement growth.
4. The relationship between the initial achievement level and the amount of gain in achievement.

Data were collected from the "Checklist of Assistance Received" and the Comprehensive Tests of Basic Skills pretest and posttest. Appearing in the Appendix Table 20 presents the raw data gathered from these instruments.

The independent variable of the study was the treatment received. The assigned variables were the two grade levels, the sex of the subjects, and the initial achievement levels. The initial achievement levels were determined by the subject's pretest quartile position on the Comprehensive Tests of Basic Skills in arithmetic and reading. The dependent variables were the arithmetic and reading achievement as determined by the pretest-posttest gain scores on the Comprehensive Tests of Basic Skills.

Tables 3 and 4 present summaries of the data as it was compiled into groups. Raw score means and standard deviations for the pretests, posttests and gain score means and standard deviations were computed for each grade level by treatment group and sex of the student. Table 3 presents compiled data related to arithmetic achievement, Table 4 reading achievement.

The sections which follow are titled according to the variables under investigation. Null hypotheses are presented followed by tables summarizing (1) the descriptive data and (2) the results of analyses of the data. Significant results are indicated. Data related to the effect of treatment, sex and grade level were examined by utilization of two-way analyses of variance. Correlation analyses were used in determining the relationship between the initial achievement level and achievement gains.

The .05 level of significance was chosen for rejection of the null hypotheses.

Table 3

Summary of Descriptive Data
Raw Score Means, Gain Score Means and Standard Deviations
from Pretests and Posttests on the
Comprehensive Tests of Basic Skills
Arithmetic Achievement

Grade Level	Treatment Group	Sex G: Girls B: Boys	Number	Pretest Mean SD	Posttest Mean SD	Gain Score Mean SD
5th	1	G	18	39.7 9.8	54.8 15.4	15.2 10.3
		B	14	36.6 10.3	46.6 13.6	10.1 14.8
	2	G	13	41.6 9.6	49.8 10.4	8.2 7.2
		B	18	37.0 13.5	46.1 14.8	9.1 9.6
	3	G	22	41.5 11.2	51.3 14.0	9.8 7.5
		B	9	40.8 12.3	46.3 13.2	5.6 6.5
6th	1	G	5	31.8 9.4	51.2 5.2	19.4 8.8
		B	6	49.2 17.2	62.7 16.0	13.5 13.6
	2	G	3	64.3 6.4	63.7 2.1	0.0 8.4
		B	13	49.5 16.2	56.9 19.0	7.4 7.0
	3	G	25	56.1 10.2	59.0 13.8	2.9 11.2
		B	19	52.8 13.3	56.0 13.1	3.2 4.5

Table 4

Summary of Descriptive Data
Raw Score Means, Gain Score Means, and Standard Deviations
from Pretests and Posttests on the
Comprehensive Tests of Basic Skills
Reading Achievement

Grade Level	Treatment Group	Sex G: Girls B: Boys	Number	Pretest Mean SD	Posttest Mean SD	Gain Score Mean SD
5th	1	G	18	31.1 8.5	41.6 10.0	10.6 8.5
		B	14	24.6 9.0	35.5 9.7	10.9 7.0
	2	G	13	27.5 6.5	36.3 11.4	8.9 10.5
		B	18	30.4 10.7	38.9 10.7	8.5 7.1
	3	G	22	35.1 9.3	38.3 12.6	3.2 6.9
		B	9	28.8 8.5	30.7 10.2	1.9 8.2
6th	1	G	5	29.2 11.1	31.2 10.8	2.0 11.0
		B	6	37.0 14.9	44.8 15.5	7.8 5.0
	2	G	3	38.3 10.0	40.0 5.3	1.7 6.7
		B	13	32.4 15.0	46.3 15.8	13.9 11.8
	3	G	25	38.1 11.2	42.3 10.6	4.2 7.9
		B	19	38.0 11.1	42.6 14.3	4.6 8.4

ACHIEVEMENT GAINS, THE TREATMENT GROUPS AND SEX OF THE SUBJECTS

Hypothesis 1

There are no differences among the three groups of fifth or sixth grade migrant children in achievement as determined by the Comprehensive Tests of Basic Skills gain scores in (a) arithmetic and (b) reading.

Hypothesis 2

There are no differences between girls and boys in achievement as determined by the Comprehensive Tests of Basic Skills gain scores in (a) arithmetic and (b) reading.

Tables 5 through 8 present summaries and analyses of the data for the fifth grade boys and girls in arithmetic and reading gain scores. Tables 9 through 12 present summaries and analyses of the data for the sixth grade boys and girls in arithmetic and reading gain scores. Discussion of the results of the analyses of variance follow the tabled data.

Results presented in Table 6 show that none of the computed F values exceeded the critical F value. $p > .05$. Differences among the performances of the three treatment groups were not significant. The data indicated no differences between the sexes as well. Null Hypotheses 1 and 2 as they relate to fifth grade arithmetic achievement were retained.

The results presented in Table 8 indicated there was a significant difference at the .05 level among the three treatment groups. Null Hypothesis 1 as it relates to fifth grade reading achievement was rejected.

Since data in Table 8 indicated $p > .05$ for the sex variable,

Table 5

Summary of Descriptive Data
Mean Gain Scores from the Comprehensive Tests of Basic Skills
Arithmetic Subtest
Fifth Grade: Sex by Treatment Group

Sex		Treatment Groups		
		1	2	3
Boys	Mean	10.07	9.06	5.56
	SD	14.76	9.60	6.48
	N	14.00	18.00	9.00
Girls	Mean	15.17	8.15	9.82
	SD	10.34	7.22	7.46
	N	18.00	13.00	22.00
		Grand Mean = 9.64		

Table 6

Summary of the Two-way Analysis of Variance
Arithmetic Achievement
Gain Scores from the Comprehensive Tests of Basic Skills
Fifth Grade: Sex by Treatment Group

Source	df	SS	MS	F^{a}
Sex (A)	1.	171.88	171.88	1.81
Treatment (B)	2.	396.93	198.47	2.09
A X B	2.	152.22	76.11	0.80
Error	88.	8347.56	94.86	

$^{a}{}_{.95}F(2,88) = 3.11$

Table 7

Summary of Descriptive Data
Mean Gain Scores from the Comprehensive Tests of Basic Skills
Reading Subtest
Fifth Grade: Sex by Treatment Group

Sex		Treatment Groups 1	2	3
Boys	Mean	10.93	8.50	1.89
	SD	6.96	7.13	8.22
	N	14.00	18.00	9.00
Girls	Mean	10.56	8.85	3.18
	SD	8.46	10.48	6.88
	N	18.00	13.00	22.00

Grand Mean = 7.32

Table 8

Summary of the two-way Analysis of Variance
Reading Achievement
Gain Scores from the Comprehensive Tests of Basic Skills
Fifth Grade: Sex by Treatment Group

Source	df	SS	MS	F^a
Sex (A)	1.	3.85	3.85	0.06
Treatment (B)	2.	1050.91	525.46	8.31*
A X B	2.	10.07	5.03	0.08
Error	88.	5561.73	63.20	

$^a{}_{.95}F(2,88) = 3.11$

$*p < .05$

Table 9

Summary of Descriptive Data
Mean Gain Scores from the Comprehensive Tests of Basic Skills
Arithmetic Subtest
Sixth Grade: Sex by Treatment

		Treatment Groups		
Sex		1	2	3
	Mean	23.00	7.39	3.16
Boys	SD	21.00	6.98	4.54
	N	8.00	13.00	19.00
	Mean	19.40	0.67	2.88
Girls	SD	8.79	8.39	11.16
	N	5.00	3.00	25.00

Grand Mean = 9.19

Table 10

Summary of the Two-way Analysis of Variance
Arithmetic Achievement
Gain Scores from the Comprehensive Tests of Basic Skills
Sixth Grade: Sex by Treatment

Source	df	SS	MS	F^a
Sex (A)	1.	171.89	171.89	1.54
Treatment (B)	2.	3135.54	1567.77	14.04*
A X B	2.	110.25	55.13	0.49
Error	67.	7484.11	111.70	

$^{a}{}_{.95}F(2,67) = 3.15$

$^{*}p < .05$

Table 11

Summary of Descriptive Data
Mean Gain Scores from the Comprehensive Tests of Basic Skills
Reading Subtest
Sixth Grade: Sex by Treatment

Sex		Treatment Groups		
		1	2	3
	Mean	9.75	13.92	4.58
Boys	SD	5.60	11.77	8.35
	N	8.00	13.00	19.00
	Mean	2.00	1.67	4.20
Girls	SD	10.96	6.66	7.86
	N	5.00	3.00	25.00

Grand Mean = 6.02

Table 12

Summary of the Two-way Analysis of Variance
Reading Achievement
Gain Scores from the Comprehensive Tests of Basic Skills
Sixth Grade: Sex by Treatment

Source	df	SS	MS	F^a
Sex (A)	1.	501.96	501.96	6.48*
Treatment (B)	2.	84.50	42.25	0.55
A X B	2.	260.56	130.28	1.68
Error	67.	5187.72	77.43	

$^{a}{}_{.95}F(1,67) = 3.15$

*$p < .05$

it may be concluded that there was no significant difference between boys and girls as related to fifth grade reading achievement. Hypothesis 2 as it relates to fifth grade reading was retained.

Upon examination of the descriptive data presented in Table 7 it was concluded that the differences in achievement found among the three treatment groups favored Treatment Groups 1 and 2 over 3.

Table 10 shows that the computed value of F exceeds the critical value of F at the .05 level for the three treatment groups. There was a significant difference among the treatment groups. Null Hypothesis 1 as it relates to the sixth grade arithmetic achievement must be rejected.

Since data in Table 10 shows $p > .05$ for the sex variable, differences between boys and girls in arithmetic achievement for the sixth grade was not significant. Null Hypothesis 2 as it relates to sixth grade arithmetic achievement was retained.

Table 12 shows the computed F value for the differences between the boys and girls exceeds the critical value of F at the .05 level. There was a significant difference between the sexes in reading achievement in the sixth grade. Inspection of Table 11 reveals that difference favors the boys. Null Hypothesis 2 as it relates to sixth grade reading must be rejected.

Since data on Table 12 shows $p > .05$ for the treatment variable, it may be concluded that differences among the treatment groups was minimal. Null Hypothesis 1 as it relates to sixth grade reading achievement was retained.

ACHIEVEMENT GAINS BY THE GRADE LEVELS

Hypothesis 3

There are no differences between the fifth and sixth grade migrant children in achievement as determined by the Comprehensive Tests of Basic Skills gain scores in (a) arithmetic and (b) reading.

Tables 13 and 14 present summaries and analyses of data related to arithmetic achievement, Tables 15 and 16 reading achievement. Discussion of the results of the analyses of variance follow the tabled data.

Table 14 indicates the computed values of F are all less than the critical F value, $p > .05$. Differences between the grade levels were not significant. Therefore, Null Hypothesis 3 as it relates to arithmetic achievement was retained.

Table 16 shows that the computed value of F for the differences between the sexes exceeds the critical value of F at the .05 level. This is consistent with Table 12 which indicated sex differences in the sixth grade. Since data in Table 16 indicate $p > .05$ for the grade level variable, it may be concluded that differences between the grade levels were not significant. Therefore, Null Hypothesis 3 as it relates to reading achievement was retained.

ACHIEVEMENT GAINS AND INITIAL ACHIEVEMENT LEVEL

Hypothesis 4

There is no relationship between the initial achievement level as determined by the Comprehensive Tests of Basic Skills pretest scores and the achievement rate as determined by the Comprehensive Tests of Basic Skills gain scores in (a) arithmetic and (b) reading for either the fifth or sixth grade.

Tables 17 and 18 present the results of correlation analyses for the fifth and sixth grades respectively. The pretest quartile of

Table 13

Summary of Descriptive Data
Mean Gain Scores from the Comprehensive Tests of Basic Skills
Arithmetic Achievement
Grade Level by Sex

Grade Level		Sex	
		Boys	Girls
	Mean	8.63	11.23
Fifth	SD	11.02	8.83
	N	41.00	53.00
	Mean	8.50	5.06
Sixth	SD	12.69	12.10
	N	40.00	33.00

Grand Mean = 8.36

Table 14

Summary of the Two-way Analysis of Variance
Arithmetic Achievement
Gain Scores from the Comprehensive Tests of Basic Skills
Grade Level by Sex

Source	df	SS	MS	F[a]
Grade Level (A)	1.	402.69	402.69	3.30
Sex (B)	1.	7.28	7.28	0.06
A X B	1.	369.12	369.12	3.03
Error	163.	19880.67	121.97	

[a] $_{.95}F(1,163) = 3.91$

Table 15

Summary of Descriptive Data
Mean Gain Scores from the Comprehensive Tests of Basic Skills
Reading Achievement
Grade Level by Sex

Grade Level		Sex	
		Boys	Girls
	Mean	7.89	7.08
Fifth	SD	7.90	8.90
	N	41.00	53.00
	Mean	8.65	3.64
Sixth	SD	9.90	8.07
	N	40.00	33.00
		Grand Mean = 6.81	

Table 16

Summary of 2 by 2 Analysis of Variance
Reading Achievement
Gain Scores from the Comprehensive Tests of Basic Skills
Grade Level by Sex

Source	df	SS	MS	F^a
Grade Level (A)	1.	72.18	72.18	0.94
Sex (B)	1.	343.22	343.22	4.47*
A X B	1.	179.92	179.92	2.34
Error	163.	12520.82	76.82	

$^{a}{}_{.95}F_{(1,163)} = 3.91$

$^{*}p < .05$

of the student was compared to the gains made in arithmetic and reading.

Table 17

Results of Fifth Grade Correlation Analyses
Initial Achievement Levels and Achievement Rate
Pretest Quartile and Gain Scores
from
Comprehensive Tests of Basic Skills

Subject	N	Relationship	r^a
Reading	94	Pretest Quartile X Gains	-0.21
Arithmetic	94	Pretest Quartile X Gains	-0.12

[a] $_{.95}r_{(92)} = .21$

Data from Table 17 show $p > .05$ for both comparisons. There was no significant relationship between the initial achievement level and the gains made in reading or arithmetic. Therefore Null Hypothesis 4 as it relates to the fifth grade was retained.

Table 18

Results of Sixth Grade Correlation Analyses
Initial Achievement Level and Achievement Rate
Pretest Quartile and Gain Scores
from
Comprehensive Tests of Basic Skills

Subject	N	Relationship	r^a
Reading	71	Pretest Quartile X Gains	-0.23*
Arithmetic	71	Pretest Quartile X Gains	-0.31*

[a] $_{.95}r_{(69)} = .232$

*$p < .05$

The very slight negative relationship indicated by the computed r compared to the critical r for arithmetic and reading achievement would mean that the lower the pretest achievement level the greater the gains. However, this relationship must be attributed to regression since extreme scores are involved. It has been concluded that the relationship between initial achievement and achievement gains was so slight, and so apt to be a regression factor that it must be ignored. Therefore, Null Hypothesis 4 as it relates to sixth grade was retained.

Table 19 presents a summary of the six tables of two-way analyses of variance which yielded information related to the first three hypotheses of this study. The interpretation of this table is contained in the following section.

Table 19

Summary of Analysis of Variance Results

Table	Grade	Subject	Variables	p
6	5	Arithmetic	Sex Treatment	N.S. N.S.
8	5	Reading	Sex Treatment	N.S. .05
10	6	Arithmetic	Sex Treatment	N.S. .05
12	6	Reading	Sex Treatment	.05 N.S.
14	5, 6	Arithmetic	Sex Grade Level	N.S. N.S.
16	5, 6	Reading	Sex Grade Level	.05 N.S.

SUMMARY OF THE INTERPRETATIONS OF THE DATA

Each variable related to the five hypotheses is listed in the order of findings. The results of the statistical analyses for each variable related to the five hypotheses are discussed, significant differences are noted, and rejection or acceptance of each hypothesis is stated.

Differences Among the Treatment Groups

Significant differences were found among the three treatment groups favoring Groups 1 and 2 for reading achievement in the fifth grade. Significant differences were found among the three treatment groups favoring Group 1 for the arithmetic achievement in the sixth grade. Two of the treatment analyses, arithmetic achievement in the fifth grade and reading achievement in the sixth grade found differences to be not significant. Thus, Null Hypothesis 1 was accepted as it relates to arithmetic in the fifth and reading in the sixth grade. Null Hypothesis 1 was rejected as it relates to reading in the fifth and arithmetic in the sixth grade.

Differences Between Boys and Girls

Significant differences were found between the boys and girls in reading achievement for the sixth grade favoring the boys. All other analyses related to the sex of the subject were found to be not significant. Thus, Null Hypothesis 2 was accepted as it relates to fifth grade reading and arithmetic achievement and sixth grade arithmetic. Null Hypothesis 2 was rejected as it related to reading achievement in the sixth grade by the boys.

Differences Between the Grade Levels

No significant differences were found between the grade levels. Therefore, Null Hypothesis 3 was accepted.

The Relationship Between the Initial Achievement Level and Gains in Achievement

Correlation analyses indicated essentially no relationship between initial achievement and gains in achievement. The very minor negative relationship found in the sixth grade was attributed to regression in light of the involvement of extreme scores. Therefore, Null Hypothesis 4 was accepted.

SUMMARY

In Chapter 4 the results of the study were presented. Data were collected, tabled, analyzed, and interpreted in an effort to determine:

(1) The effect of paraprofessional assistance in three treatment groups in terms of achievement gains.

(2) The influence of the sex of the student on the amount of gains.

(3) The possible differences between the grade levels.

(4) The relationship between the initial achievement level and the amount of gain in achievement.

Null hypotheses were presented followed by tables summarizing the descriptive data and the results of analyzed data. Data related to the effects of treatments, sex, and grade level were examined by means of two-way analyses of variance. The .05 level of significance was chosen for rejection of the null hypotheses. Data related to the initial achievement level and gains in achievement were examined by means of a correlation analysis. Following interpretation of the data, null hypotheses were rejected or accepted.

Null Hypotheses 1 and 2 were partially rejected. Null Hypotheses 3 and 4 were accepted.

The final chapter of this report presents the conclusions and implications of the study, recommendations, and a summary of the entire investigation.

Chapter 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This final chapter of the study is organized into three major sections: (1) summary of the study, (2) conclusions and implications of the study, and (3) recommendations for further research.

SUMMARY OF THE STUDY

It was the purpose of this study to investigate the effect of guided paraprofessional assistance on the academic achievement of lower achieving intermediate grade migrant children. The summary of the study approximately follows the order of the preceding chapters: (1) introduction and survey of literature related to this study, (2) procedures followed, (3) data collected, and (4) testing of the data.

Introduction and Survey of Literature Related to the Study

A review of the literature related to migrant children revealed the following handicapping circumstances: Irregular attendance patterns have resulted in lack of continuity in migrant childrens' education. Social, economic and health problems have stemmed from the circumstances of their being children of migratory farm workers. Language and cultural differences have derived from their Mexican-American heritage. These restricting circumstances have made it difficult for migrant children to meet the demands of the traditional school. Retarded progress and failure have often been the outcome.

It was the purpose of this study to examine one possible means of overcoming some of the overwhelming handicaps experienced by migrant children. The use of indigenous paraprofessionals was featured in the proposal to supplement the education of migrant children by the Fresno County Migrant Education Program. Selected from the community in which the school was situated these individuals gave assistance to migrant children under the supervision of the classroom teacher. Many of these paraprofessionals were of Mexican-American descent as are the majority of migrant children.

It was felt by this investigator that a special kind of communication between the paraprofessional and the migrant child contributed to the value of the assistance given. Paraprofessionals are a humanizing influence in crowded classroom situations.

Migrant Education Programs were reviewed. These programs stressed, as did the California Plan: getting the migrant children into school, gaining their confidence and providing them with appropriate learning experiences. There were wide variations in curricular approaches. The improvement of communication skills appeared in most programs. Health services were commonly provided to migrant children. The use of paraprofessionals in a tutorial role was not a major emphasis by other Migrant Education Programs.

Literature on the use of the paraprofessional in education showed this to be a recent phenomenon. Before 1965 and the advent of new federal programs giving aid to education, few paraprofessionals were involved in education. Since that time their use has mushroomed. Studies of the paraprofessional's influence on pupil performance showed improved academic growth in a number of cases. No studies were found in which the effect of paraprofessional assistance on migrant children was specifically investigated.

Literature on tutoring by other non-professionals was most encouraging, revealing that effective tutoring has by no means been limited to professional educators. Neither lack of formal pedagogical skills, age, nor status of the tutor stood in the way of successful tutoring. Children tutoring children proved valuable to tutor and tutee as well. The tutor's ability to understand and communicate in an empathetic manner counted most, although training, supervision and guidance were deemed advisable.

Writers agreed that the paraprofessional must be involved in the instructional program and not limited to clerical, housekeeping, or playground chores if educational advantages are to accrue to disadvantaged children. Writers were in agreement that appropriate training and supervision by the concerned professional was essential.

Out of the many reports on paraprofessionals and other nonprofessionals used as tutors to further the education of disadvantaged children few reported negative results. In those cases where educational advantage was not derived the circumstances affecting the outcome could be attributed to the fact that adult-pupil ratio was not improved, the paraprofessional served too many teachers, too many paraprofessionals were placed in one classroom, or too little of the paraprofessional's time was spent in the instructional program.

Literature on sex differences in achievement at the elementary school level showed that girls achieved only slightly higher than boys particularly in the language arts area. Differences were minimal.

It was felt by this investigator that the present study was in keeping with past literature. Yet, an investigation of this type has not taken place in the past. The needs of migrant children are so great that a study which examines the effect of using paraprofessionals in an attempt toward overcoming some of their academic problems is timely if not overdue.

Procedures Followed

Careful identification of migrant children took place following federal program guidelines. Home visits involved interviews with parents to verify their employment as migratory farm workers.

Indigenous paraprofessionals employed through the local school districts gave assistance throughout the school year to migrant children in classrooms under the supervision of the classroom teacher and guidance of a resource teacher. Preservice and inservice training were given the paraprofessional by curriculum specialists and resource teachers. Learning activities, materials and games in arithmetic and reading especially developed or purchased for use with migrant children were provided the paraprofessionals. Inservice training in the use of these activities as well as guidance and encouragement in the tutorial role continued throughout the school year.

Wide variation in the amount of assistance received by migrant children in the intermediate grades resulted from the varying circumstances at the particular school sites as well as limited funding in general. The "Checklist of Assistance Received" sorted out these variations. Three treatment conditions were differentiated. A description of the collection of data follows:

Data Collected

Academic achievement was measured by the Comprehensive Tests of

Basic Skills state mandated for use in the sixth grade and prescribed by the Migrant Education Program for use in the fifth grade as well. Pretests in the fall resulted in information which differentiated students according to achievement level. This study was limited to lower achieving students following the belief that higher achieving students are apt to continue their pattern of making good progress whether or not special assistance was provided them. Pretest quartiles provided the means for comparing initial achievement level with gains in achievement.

The amount of assistance received by each migrant child was recorded by resourceteachers for each of the thirty-four school sites on the "Checklist of Assistance Received." To be counted assistance had to come to at least fifteen minutes a day for at least four days a week in arithmetic and the same for reading. There was wide variation in the amount of time provided and the size of the group receiving assistance.

Posttests on the Comprehensive Tests of Basic Skills took place in the spring. As in the fall these tests were administered by the testing team employed by the Fresno County Department of Education. Machine scoring and data printout were provided by the Regional Data Processing Center.

A compilation of this data appears in the Appendix. A summary of the treatment of this data follows.

Treatment of the Data

An adaptation of the experimental non-randomized control-group pretest-posttest design number five as described by Van Dalen (1966:295) was selected as the paradigm for this study.

Data were collected, summarized, analyzed and interpreted in an effort to determine:

(1) The effect of paraprofessional assistance under three conditions: Group 1: assistance in arithmetic and reading, Group 2: assistance in reading only, and Group 3: no assistance in arithmetic or reading on the gains in achievement.

(2) The influence of the sex of the student on the amount of gain in achievement.

(3) The possible differences between the two grade levels on the gains in achievement.

(4) The relationship between the initial achievement level and the amount of gain in achievement.

Achievement gains were determined by referring to the pretest posttest scores on the Comprehensive Tests of Basic Skills on (2) the arithmetic subtest and (b) the reading subtest. These were the dependent variables of the research design.

The independent variable was the treatment received. Assigned variables were the sex of the subjects and the two grade levels. Analysis of variance procedures were used to test for significance of differences between group mean. Correlation analyses were used to determine the significance of the relationship between the initial achievement level and the arithmetic and reading gains.

Findings of the investigation were encouraging. A discussion of the outcome is reported along with the conclusions and implications in the section which follows.

CONCLUSIONS AND IMPLICATIONS OF THE STUDY

Conclusions drawn from the investigation are presented relative to the findings reported in Chapter 4. The four research hypotheses as stated in Chapter 1 are discussed along with the implications of the findings. Subjective conclusions by the investigator are given.

Hypothesis 1

Lower achieving intermediate grade migrant children who receive paraprofessional assistance in (1) arithmetic, reading or (2) reading alone show greater gains in achievement than migrant children who receive (3) no paraprofessional assistance in arithmetic or reading as determined by pretest-posttest gain scores on the Comprehensive Tests of Basic Skills an (a) arithmetic and (b) reading.

Findings of the study supported this hypothesis as it regarded reading achievement in the fifth grade. Close inspection of the data for the fifth grade migrant children who received assistance in arithmetic in Group 1 showed higher mean gains in arithmetic than Group 2 or Group 3. Although the gains were there the differences were not significant.

Findings supported this hypothesis as it regarded sixth grade in arithmetic achievement. Close inspection of the mean gains showed that if boys alone were under investigation the findings would have supported this hypothesis for reading in the sixth grade also. As it was, findings were not found to be significant for the sixth grade in reading.

Implications of these findings suggest that paraprofessional assistance can help some lower achieving migrant children to improve their academic achievement.

Hypothesis 2

Girls who receive paraprofessional assistance show greater gains in achievement than boys as determined by the Comprehensive Tests of

Basic Skills gain scores in (a) arithmetic and (b) reading.

There was no support given to this hypothesis. However, when stated in the null form which predicted no differences between girls and boys the null hypothesis was rejected because boys in the sixth grade showed significantly greater gains than girls in reading achievement. Therefore, not only did girls not show greater achievement gains in any of the treatments but the significant differences which were found favored the boys!

Implications of these findings: Although it was expected that girls would show greater gains this was not the case. Findings would suggest that paraprofessional assistance was somehow especially beneficial to some sixth grade boys in reading.

Hypothesis 3

There are no differences between the grade levels in the amount of achievement gain as determined by the Comprehensive Tests of Basic Skills gain scores in (a) arithmetic and (b) reading.

This hypothesis was supported. It was highly unlikely that either the fifth or the sixth grade would show greater gains than the other. As it turned out this was the case.

Hypothesis 4

The lower the migrant student's initial achievement level as determined by his pretest quartile position the greater the gains in achievement as determined by the Comprehensive Tests of Basic Skills gain scores in (a) arithmetic and (b) reading.

There was no association found between initial levels of achievement and the amount of gains made by any of the migrant children in this study.

Although it was expected that the lowest achieving student might benefit the most from paraprofessional assistance this was not the case. The very small correlation found between initial achievement level and gains was attributed to regression. This was expected because of the extreme scores being dealt with.

Subjective Conclusions

This investigator viewed the results of this study with encouragement. It was found that paraprofessional assistance had a positive effect on some migrant children.

Speculation as to reasons for minimal achievement gains were suggested by the investigator:

1. Too many children were assigned to the paraprofessional to be adequately helped.
2. Too many teachers were served by one paraprofessional so that planning time was inadequate.
3. Too little time was given in assistance.
4. Some teachers did not provide effective guidance for the paraprofessional.
5. Screening or training of the paraprofessional may have been inadequate.

Personal observation by this investigator on the difficulties of educating disadvantaged children in rural schools are given. Unless you have "spent time" in rural schools you might not appreciate the cause for celebration when real gains in achievement are made. The rural elementary school teacher has enormous hurdles to overcome in trying to educate lower achieving disadvantaged children: the continual turnover of migrant children, the much too large classes; the lack of air conditioning; the tradition of supplying only state adopted grade level textbooks and materials to classrooms when most of the children cannot read these books, much less learn from them; the difficulty of communicating with the home when parents do not speak English; and the ever present poor health of poor children, especially the aching teeth and recurring pediculosis. When a paraprofessional is provided it is always for too little time and for too many children.

Assistance by the paraprofessional is limited. Other disadvantaged or emotionally handicapped children in the same classroom are out of bounds for the paraprofessional yet seated next to migrant children these children are just as in need of special help. Yard duty assistance by the paraprofessional has recently not been allowed under Federal guidelines. Teachers resent this. Frequently planning time for the teacher and paraprofessional is not scheduled by the administrator. Planning is restricted to their off duty hours or neglected in many cases. These circumstances need to improve before the paraprofessional and teacher can work together as a team.

Speculation as to reasons why the effect of paraprofessional assistance was sometimes positive: It is most encouraging to find aid to education coming in the form of human help given directly to the disadvantaged student. Low achieving migrant children have the same need that all children, if not all human beings, have at one time or another; the need to have a concerned, understanding, responsive person, sit down with him, explain what is going on, tell him what is expected of him, and show him how to do it. And if he has trouble remembering what it is he needs to know, this helping person takes the time to go over it again. Then in an interesting way, such as in an educational game, the helping person reinforces his learning. This is how the paraprofessional does it.

When the indigenous paraprofessional and the classroom teacher begin to communicate and plan together, the feedback which the aide can give the teacher helps the teacher better understand the learning problems experienced by the child. The teacher is more apt to focus in on the disadvantaged child's particular learning needs and to more carefully plan remediation as directions are thought out and given to the paraprofessional. It is on these occasions that academic growth is promoted.

In answering the question "How do paraprofessionals improve the learning of children?" Riessman, long time advocate of paraprofessional use, stated:

> The requirement of assigning a child to an aide for reinforcement has demanded that a more definitive approach to specifically what the child should be learning. (Riessman, 1972:88).

Suggestions for the improvement of paraprofessional assistance:

1. The ratio of paraprofessionals to students should be increased. Time to give adequate assistance must be available.
2. The ratio of teachers to paraprofessional should be decreased. Planning time must be available.
3. Continual training and supervision of paraprofessionals following careful screening must take place by the involved professionals.

4. Career opportunities should be available for the paraprofessional in keeping with experience and training.
5. Inservice education of classroom teachers is essential in areas of: individualization of instruction, making efficient use of paraprofessionals, and the special needs of disadvantaged children.
6. A team spirit between the teacher and the paraprofessional must be fostered. Training should be a team venture. Schedules should allow time for planning and for feedback.

RECOMMENDATIONS FOR FURTHER RESEARCH

It is recommended that replication of the study add criterion referenced tests for purposes of diagnosis and prescription to improve arithmetic and reading skills as well as for an improved means of measuring growth. Criterion referenced spelling tests might well be included.

It is recommended that the study be replicated at other grade levels. Paraprofessional assistance may have greater impact in the primary grades.

It is recommended that the study be replicated in such a manner that individual tutoring be compared with small group tutoring by the paraprofessional.

It is recommended that an instrument be developed or found which would measure changes in the Affective Domain following a year or more of paraprofessional assistance.

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APPENDIX

MODULE
RESOURCE TEACHER________________
GRADE__________________________

SCHOOL________________________
DISTRICT______________________
TUTORS________________________

CHECKLIST OF ASSISTANCE RECEIVED

1971-72

MIGRANT STUDENTS —PRETESTED ON THE CTBS	ASSISTANCE IN ARITHMETIC				ASSISTANCE IN READING			
	Not At All	Less Than 2	15 min./day 4 day/week	More Than 2	Not At All	Less Than 2	15 min./day 4 day/week	More than 2
	0	1	2	3	0	1	2	3

ERNEST A. POORE
Superintendent

Fresno County
Department of Education

TUTOR PERFORMANCE RECORD

NAME ______________________________ District ________________________ School Month ____________________

DATE	MIGRANT CHILD	SUBJECT & CONCEPT AREA	GRADE	APPROX. TIME Mon. Tues. Wed. Thurs. Fri.	COMMENTS
		( )Math ( )Read. ( )Lang. Dev.			
		( ) " ( ) " ( ) "			
		( ) " ( ) " ( ) "			
		( ) " ( ) " ( ) "			
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HS:cb

Table 20

Descriptive Data Entered on Tabulation Cards

Student Number	Grade 1,2	Sex 1,2	Treatment Group 1,2,3	Reading pre test	Reading post test	Arithmetic pre test	Arithmetic post test	Quartiles reading	Quartiles arithmetic
.001	1	2	2	27	29	46	40	2	2
.002	1	2	2	55	68	62	80	4	3
.003	1	1	3	38	49	63	69	3	3
.004	1	2	3	40	59	39	44	3	1
.005	1	2	3	45	47	65	62	3	4
.006	1	1	3	52	52	51	51	4	2
.007	1	2	3	29	35	58	66	2	3
.008	1	1	3	28	35	52	31	2	2
.009	1	1	3	52	46	58	36	4	3
.010	1	1	3	40	48	67	58	3	4
.011	1	2	2	26	32	33	39	1	1
.012	1	1	1	14	27	36	51	1	1
.013	1	1	3	44	48	67	55	3	4
.014	1	2	2	22	31	50	61	1	2
.015	1	2	3	52	63	67	70	4	4
.016	1	2	3	59	54	66	68	4	4
.017	1	2	3	23	26	42	37	1	2
.018	1	1	3	50	41	67	78	4	4
.019	1	2	3	29	34	31	38	2	1
.020	1	2	1	32	46	28	80	2	1
.021	1	1	3	51	59	38	56	4	1
.022	1	2	3	35	35	68	66	2	4
.023	1	1	3	19	35	58	68	1	3
.024	1	2	2	27	42	63	73	2	3
.025	1	1	1	37	48	40	60	3	1
.026	1	1	3	60	49	62	70	4	3
.027	1	1	3	20	23	53	73	1	2
.028	1	2	2	50	67	71	81	4	4
.029	1	1	1	23	28	36	47	1	1
.030	1	2	3	48	45	39	47	4	1
.031	1	2	1	49	54	56	70	4	3
.032	1	1	3	42	38	65	63	3	4
.033	1	2	3	42	42	64	73	3	3
.034	1	2	1	19	36	38	89	1	1
.035	1	2	3	55	60	56	56	4	3
.036	1	2	1	55	58	65	72	4	4
.037	1	2	1	18	24	44	36	1	2
.038	1	2	2	35	48	39	48	2	1
.039	1	2	1	38	54	59	75	3	3
.040	1	2	2	15	65	49	61	1	2
.041	1	1	2	48	42	69	63	4	4
.042	1	1	2	39	44	67	62	3	4
.043	1	1	3	36	41	59	55	2	3
.044	1	1	3	21	34	68	78	1	4
.045	1	1	3	40	51	45	67	3	2
.046	1	2	3	33	43	63	69	2	3
.047	1	1	3	53	55	67	74	4	4
.048	1	1	3	29	24	45	49	2	2
.049	1	1	3	33	40	45	45	2	2
.050	1	2	3	27	27	61	68	2	3
.051	1	1	2	28	34	57	66	2	3
.052	1	2	2	54	62	67	74	4	4
.053	1	2	2	11	30	16	19	1	1
.054	1	2	3	31	53	42	47	2	2
.055	1	1	3	35	43	62	62	2	3
.056	1	1	3	46	59	67	78	3	4
.057	1	1	1	42	34	16	50	3	1
.058	1	1	3	26	28	51	59	1	2
.059	1	2	1	41	53	54	73	3	3
.060	1	1	3	33	53	67	67	2	4
.061	1	1	3	36	37	43	51	2	2
.062	1	1	3	28	23	39	32	2	1
.063	1	2	1	21	26	17	50	1	1
.064	1	1	3	41	47	43	49	3	2
.065	1	2	3	25	17	45	41	2	2
.066	1	2	3	50	64	50	50	4	2
.067	1	2	2	19	28	41	39	1	1
.068	1	2	2	32	43	39	56	2	1
.069	1	1	1	30	19	31	48	2	1
.070	1	2	2	48	57	68	69	4	4
.071	1	2	3	40	52	71	71	4	4
.072	1	2	3	35	28	29	35	2	1
.073	1	2	3	24	25	48	56	1	2
.074	2	2	1	33	36	43	59	3	3
.075	2	1	3	49	51	55	59	4	4
.076	2	1	3	42	45	44	58	4	3
.077	2	2	2	34	45	19	53	3	1
.078	2	1	2	30	33	43	54	2	3
.079	2	1	3	33	31	38	39	3	2
.080	2	1	1	37	42	33	55	4	2
.081	2	2	1	14	35	41	71	1	3
.082	2	2	2	24	31	34	43	2	2
.083	2	1	2	25	22	42	60	2	3
.084	2	1	3	29	43	35	37	2	2
.085	2	2	1	32	29	50	44	3	4
.086	2	1	1	27	45	56	67	2	4
.087	2	2	3	18	19	18	35	1	1
.088	2	1	3	41	41	46	47	4	3
.089	2	2	2	50	60	30	40	4	1
.090	2	2	2	42	47	58	68	4	4
.091	2	1	1	28	46	38	55	2	2
.092	2	1	1	23	20	31	36	1	1
.093	2	2	2	25	20	34	38	2	2
.094	2	1	1	31	51	55	72	3	4
.095	2	1	1	32	52	50	73	3	4
.096	2	1	1	45	43	26	57	4	1
.097	2	2	1	30	41	27	65	2	1
.098	2	2	3	39	44	36	43	4	2
.099	2	1	3	33	42	38	66	3	2
.100	2	1	2	23	28	22	20	1	1
.101	2	1	2	34	48	55	63	3	4
.102	2	1	3	22	32	25	26	1	1
.103	2	2	2	20	28	36	47	1	2
.104	2	2	3	28	28	34	34	2	2
.105	2	1	1	37	43	53	74	4	4
.106	2	2	3	22	24	43	44	1	3
.107	2	2	1	14	27	27	58	1	1
.108	2	2	3	44	29	52	52	4	4
.109	2	2	1	17	21	29	26	1	1
.110	2	1	3	33	34	32	39	3	2
.111	2	2	2	43	54	56	74	4	4
.112	2	1	3	46	61	41	56	4	3
.113	2	1	3	27	22	44	40	2	3
.114	2	1	3	47	49	45	60	4	3
.115	2	2	2	25	24	25	28	2	1
.116	2	2	2	27	38	44	55	2	3
.117	2	2	1	26	43	48	50	2	4
.118	2	1	3	27	22	25	31	2	4
.119	2	2	1	23	30	29	34	1	1
.120	2	1	1	25	28	45	65	2	3
.121	2	1	1	35	43	30	39	3	1
.122	2	1	3	28	26	53	58	2	4
.123	2	1	3	32	36	30	41	3	1
.124	2	1	3	34	34	40	52	3	3
.125	2	2	2	13	35	48	38	1	4
.126	2	2	3	26	28	42	47	2	3
.127	2	1	1	17	41	43	70	1	3
.128	2	1	3	35	21	48	63	3	4
.129	2	2	3	27	32	49	54	2	4
.130	2	1	1	26	39	33	55	2	2
.131	2	2	2	22	38	44	43	1	3
.132	2	1	2	26	44	50	48	2	4
.133	2	2	1	19	38	36	49	1	2
.134	2	1	1	37	42	47	71	4	3
.135	2	1	2	31	37	42	53	3	3
.136	2	2	2	14	31	3	17	1	1
.137	2	2	2	32	37	38	51	3	2
.138	2	1	3	35	43	60	71	3	4
.139	2	2	3	22	22	33	33	1	2
.140	2	2	1	40	55	26	28	4	1
.141	2	1	1	48	67	28	21	4	1
.142	2	1	3	50	54	51	63	4	4
.143	2	1	2	42	49	52	50	4	4
.144	2	2	2	33	40	41	51	3	3
.145	2	1	3	29	37	34	43	2	2
.146	2	2	2	41	50	36	34	2	2
.147	2	1	3	49	58	57	72	4	4
.148	2	1	2	24	30	33	48	2	2
.149	2	2	1	18	27	52	47	1	4
.150	2	2	1	20	27	28	32	1	1
.151	2	2	2	33	50	45	48	3	3
.152	2	1	3	15	14	19	36	1	1
.153	2	1	2	16	33	46	54	1	3
.154	2	1	1	21	35	44	49	1	3
.155	2	1	2	25	59	40	54	2	3
.156	2	1	3	37	47	53	72	4	4
.157	2	2	1	18	37	34	46	1	2
.158	2	1	2	24	37	44	47	2	3
.159	2	2	3	33	50	60	75	3	4
.160	2	2	1	40	51	34	44	4	2
.161	2	2	2	24	31	25	31	2	1
.162	2	1	2	33	34	46	53	3	3
.163	2	1	2	24	18	26	45	2	1
.164	2	2	2	45	41	50	70	4	4
.165	2	1	1	31	41	31	44	3	1
.166	2	1	1	21	35	40	36	1	3
.167	2	1	1	30	36	31	48	4	1

Key: Grade 1 = sixth
2 = fifth

Sex 1 = girl
2 = boy

Treatment Group
(1) Received assistance in arithmetic and reading
(2) Received assistance in reading
(3) Received no assistance in arithmetic or reading